

# Final Year Project Digital Library

by

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the requirements for the  
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# CERTIFICATION OF APPROVAL

## FYP Digital Library

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A project dissertation submitted to the  
Information Technology Programme  
Universiti Teknologi PETRONAS  
in partial fulfilment of the requirement for the  
BACHELOR OF TECHNOLOGY (Hons)  
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December 2004

## CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.



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**NURUL FAIZAH BINTI ZUHRI**

## **ABSTRACT**

The application of digital libraries or web archives has been significant during the past few years such as with the introduction of the web development technology and implementation of data repositories in office automation. The objective of the project is to apply the research done on file type conversion into the development of FYP Digital Library, a web archiving system for documentation management and preservation purposes. The current system has been too big and becoming difficult to handle, as the number of the final year project documents to be maintained and managed are of bigger numbers now. This has made the effort of keeping all these documents for reference purposes difficult. With the development of the final year project digital library that shall serve the function of web archive, these two main goals will be able to be accomplished. The web development project involves the application of RAD methodology as used in various smaller projects. In order to accomplish these objectives, various interviews with stakeholders and research done on file type conversion and information management and retrieval has been done and the result of these has contributed to the requirement analysis and design phases of the projects' final product resulting to the development of FYP Digital Library

Keywords: final year project documents, web development, archive, file type conversion, information management and retrieval

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## **ABBREVIATIONS AND NOMENCLATURES**

**AHDS** : Arts & Humanities Data Service

**FYP** : Final Year Project

**LAN** : Local Area Network

**MDD** : Model Driven Development

**PHP** : Hypertext Preprocessor

**RAD** : Rapid Application Development

**SQL** : Structured Query Language

**UML** : Unified Modelling Language

**UTP** : Universiti Teknologi PETRONAS

**WATS** : Wide Area Telephone Service

**WWW** : World Wide Web

**XHTML** : Extensible Hypertext Markup Language

# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 Background of Study**

As the university's compulsory element in all programmes offered here in UTP, final year students are required to undertake FYP which can be a design or research-based subject. The main objective of the paper is to develop a basic structure in which will enhance the students' skills in the process of knowledge application, opening their minds, self independence in solving problems as well as result presentation through minimal supervision and guidance. This paper requires them to do some research, design or development work especially on real-life problems in each respective discipline which would motivate them to produce practical and well-thought solutions. Students are to delve into research/design problems, build up objectives, apply appropriate methodology, analyse and generate the results and report the findings. The project can be in the form of laboratory experiments, computer programming, modelling, simulations, analysis and product design.

### **1.2 Problem Statement**

#### **1.2.1 Problem Identification**

Currently all the previous project reports that are kept in the libraries are in hard copy versions. There have been some cases that the reports are damaged due to the storage conditions. This is because by keeping the reports in a hard copy version, there will be lesser and lesser storage spaces available. As a result, the reports will be in a bad condition and no longer suitable to be used as reference materials. Often reports produced are serving the purpose to be used as reference materials. However by keeping all the reports in hard copies, it would be difficult for any party (students, lecturers, coordinators, etc.) to do any reference to the materials.

### **1.2.2 Significance of the Project**

By developing the FYP Digital Library, in a way it will help to solve the current situation. Even though the current situation is not perceived as a problem yet to the organization, the situation however may be simplified. With the launching of the Chancellor Complex, we are now known for our newly and improved techno building design. Therefore we need to fully utilize the university's facilities in technology and document management in order to match up with the new image. By having the digital library, we would need to create servers to store all the final year project documents.

This digital library, serving its own name, will be put online in which implemented in the university's local area network and will be made accessible online. By storing the documents in the servers in order to make it available online, we have helped to save storage spaces in the library, which was used to store previous year's documents. This can help to avoid the documents to rot in the storage spaces due to small space available for document keeping in the library. In a way, the servers function as backup storage to store the documents in an electronic form rather than hard copy versions.

By placing the documents online, in which on the university's local network, it will be made available to all user in UTP at any time compared to access to university's library which is limited to 8 am to 10 p.m. This will make the document to be easier to be accessed by users as well as made as easy reference for all users that needs it. By having this technology, we can match up to the new UTP image, futuristic and technologically improved.

### **1.3 Objective**

- To do a research on file type conversion using current web development technology.

- To develop an archiving system that will be able to store and manage documents via the web.
- To do a research on development of digital libraries and analyze how it can be applied to the UTP environment.
- To identify the most feasible way to develop the system by utilizing the technology provided.
- To gain and apply existing knowledge in web development and database systems in developing the digital library.

### **1.3.1 Relevancy of the Project**

In order to solve the problems identified earlier, it is seen to be feasible to develop a digital library for the final year project usage. Thus in order to preserve the work of previous final year students, it is feasible to develop this project which will act as the repository to store all the previous projects for any further references. After some due consideration and thorough decision making, developing a digital library instead of portal or website as proposed earlier in the semester, it is seen as the most suitable solution seeing the function it serves in order to improve the current manual system.

By having the library, any party involving with the final year reports will be able to view previous final year project reports without having the difficulty to search for desired topics. As defined by the community, archive serves the purpose as to locate desired documents in a big repository, preserve all the works as well as provide access to the repository.

### **1.4 Scope of Study**

For this final year project, the areas that will be covered are

- *Digital Library Search engine*

This part will cover the section where user (general user) interacts with the system to search for desired topic of research. This section of the project will then retrieve related searched topic according to specified keyword and will display the result to user for viewing.

- *Information Storage & Management database*

This part is considered as the vital part of the system as it stores all the documents and also manages document uploading done by assigned administrators. This part of the system will be responsible to reply to queries made by user and retrieve the documents from the storage database.

- *User (Administrator) registration & access level*

And finally the final part of the system in which responsible in storing details and assign access level of administrators of the system, which consists of academic central services staff, FYP coordinator and lecturers. The reason why the system only caters for these groups user registration is because these users will have the access to upload and maintain the storage the document database. Each of these groups will have different level of administrator access with different functionalities.

#### **1.4.1 Feasibility of the Project within the Scope and Time Frame**

Feasibility of a project is defined as capability of accomplishing in a successful manner within a reasonable period of time, taking into account economic, and environmental, legal, social, and technological factors. A project is deemed as feasible if it satisfies all constraints. For this project, the default development time frame is between 26<sup>th</sup> of May until 1<sup>st</sup> of October, which means that around 11 weeks are allocated for the development of the project.

Within this timeframe, it is estimated that there would be a change of scope in the beginning of the project development such as converting from developing a FYP Portal to FYP Digital Library, changes in the hardware and software requirements and others. Taking into consideration all these risks and assumptions, with the given timeframe, it is estimated that all these scope of study can be covered in order to accomplish the project's objectives. It is also deemed to be feasible for this project to be accomplished within the scope and time frame due to the small scope of the project; it is expected to meet the dateline, which is end of this semester.

## CHAPTER 2

### LITERATURE REVIEW / THEORY

#### 2.1 Web Development

During the past two years, the core PHP developers have done an incredible job of providing the PHP user community with powerful technology that has been able to perform remarkably well in many environments. As Web applications become more popular, Web developers must face an increasing amount of possible security vulnerabilities that have the potential to compromise their work seriously. [1]

For the development of this project, the basic underlying concept is put under web development because even though this project is all about digital library and archiving, as it is designed to be put on the university's local area network it still upholds the web development basic concept. As this project is to be develop using PHP language and utilizes crucial documents, it is important that we look into the basic security issues relating to this language as well as basic web architecture that this project should support.

Error control is the first step in providing efficient security for the system users or clients. However, among the list of malicious attacks that need to be paid attention for in this project is SQL injection. SQL injection on a Web application can have devastating consequences that go beyond the scope of most other security attacks, such as cross-site scripting, because it has the potential to destroy database and its content permanently and completely. Sensitive information often is stored on database servers and other storage facilities for later retrieval. At this point, it is critical to have at disposal a facility that allows the developer to secure that data at storage time and retrieve the information you are looking for when you need it. PHP offers an extension that allows developers to use the Mcrypt Library (to secure data by encrypting it and later decrypting it. [1]

The modern web architecture determines how system elements are identified and allocated, how the elements interact to form a system, the amount and granularity of communication needed for interaction, and the interface protocols used for

communication. Architecting the Web requires an understanding of its requirements. Berners- Lee [1996] writes that the “Web’s major goal was to be a shared information space through which people and machines could communicate.” What was needed was a way for people to store and structure their own information, whether permanent or ephemeral in nature, such that it could be usable by themselves and others, and to be able to reference and structure the information stored by others so that it would not be necessary for everyone to keep and maintain local copies. [2]

According to Beverly, “Information design-the theory and practice of presenting information in a comprehensive, usable, and effective manner-is an evolving field with ever-expanding boundaries.” [3] With the phenomenally increasing number of web pages appearing on the Internet, web documents may soon become the single most used method for distributing information. The quality of web page design varies widely according to each author’s skill, experience, and understanding of design principles. Principles of information design aren’t unique to a specific medium and can be applied, not only to printed pages, but also to web pages.

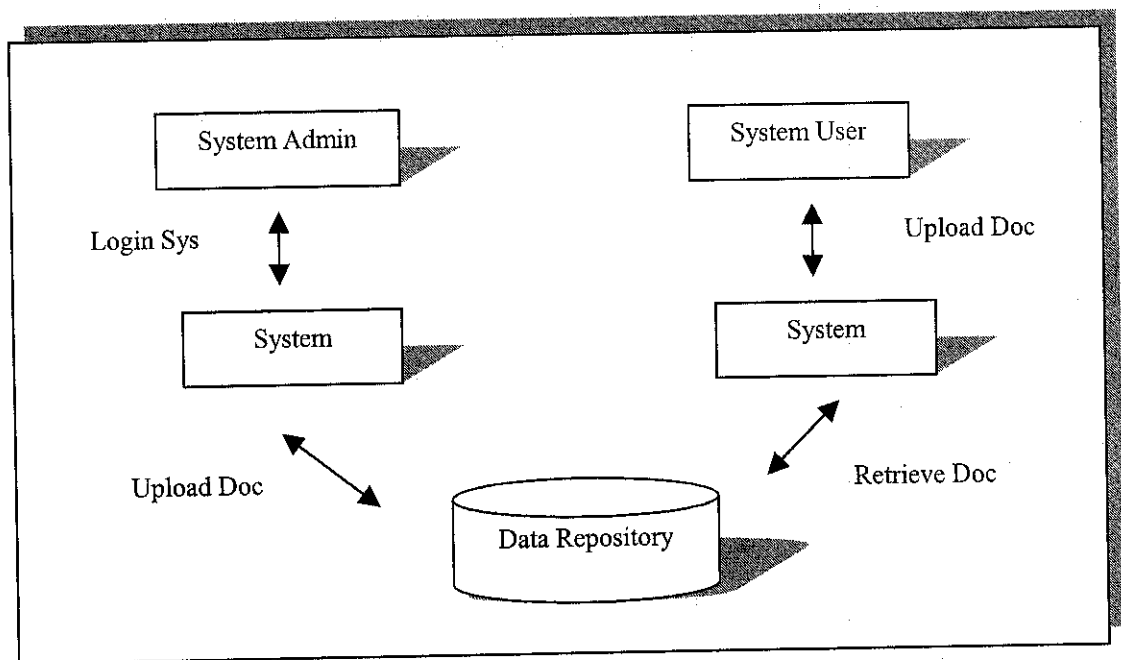
Web page designers should be especially interested in strategies that enable their readers to understand the information on a web page. Micro/macro design is a critical and effective principle of information design that applies to every type of data because it enables readers to understand complex content by giving them an overview while at the same time presenting huge detail. By properly arranging and repeating detailed and complex information, the designer creates an overall structure. Beverly also stressed on “the arrangement of elements on the page is the biggest factor in determining what people notice and read-or whether they abandon the page and surf on to someone else’s page” [3] This shows how much a good design is important to the development of a web page, in this case, FYP Digital Library.

## **2.2 Information Management (Office Automation)**

Previously, people have never even considered using digital archives because usually this method is implemented once the organization finds data management has become complicated and messy as time moves on. With the introduction of

computers and office automation, organization find it is more organized to manage its' print documents digitally apart from continuing to use file cabinets anymore. Once the organization goes online, example; business organization adopting e-commerce, information sharing goes global, people find web archiving or digital libraries of greater use.

The concept of web archives or digital libraries is that these printed documents are stored digitally and stored and preserved using a repository developed in the web and made accessible to any authorized user depending on the web's level of authentication. Lesser and lesser printed documents are copied and distributed as this method has solve this problem by creating a big number of centres of reference for easier access to the organization or even the public.

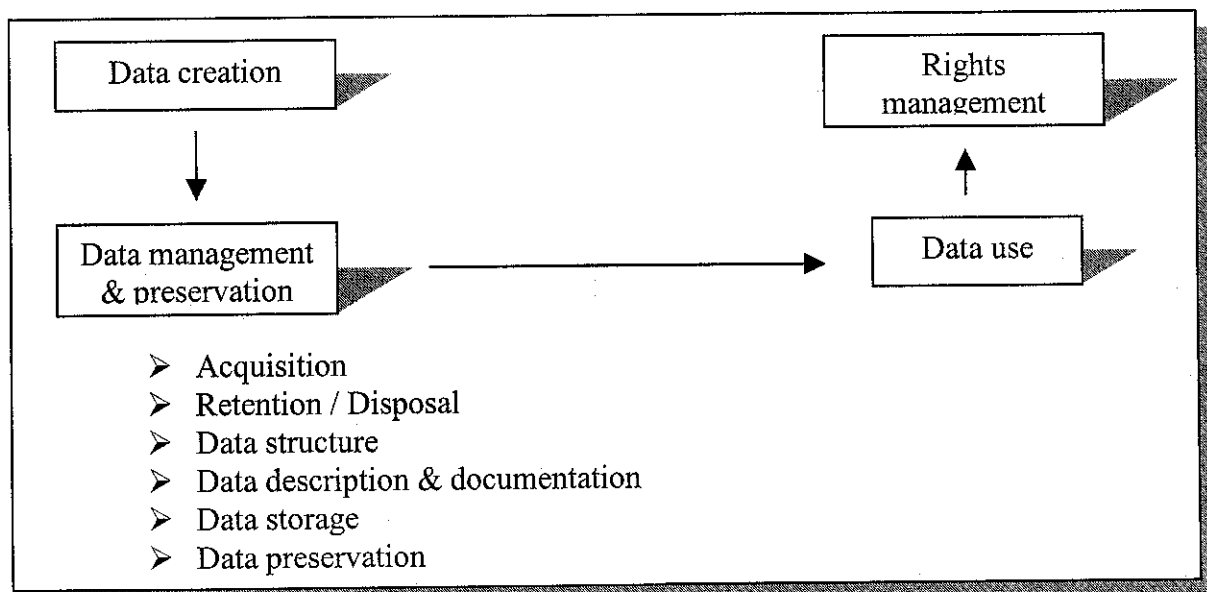


**Figure 1** Digital library concept applied to project development

However, as this technology is now greatly implemented all around the world, there have been few issues regarding digital libraries or web archives that caught a lot of people in discussion over this matter. Dorothy Warner (2002) is very definite: "Is there a plan in place to ensure that it will be there in twenty or more years?" [6] In the haste to make information available electronically there are few agreed-upon plans for the preservation of digital information and much has already been lost. Therefore it is agreed upon that any plans to digitally store information on the web or in the digital libraries, the process requires thorough research and surveys in



identifying the best practices to accomplish this goal successfully. Dorothy Warner (2002) points out that the process would have to go through summary of the main stages in the life-cycle concept developed by the AHDS as shown in the diagram below.



**Figure 2** Processes of digital archives

This life-cycle concept applies to the research, as the objective of the research is to archive previous FYP print documents into the digital library. Appropriate and necessary documents will then be created digitally (phase 1), managed and preserved into the library's archive (phase 2), used as reference in order to serve its' purpose as centre of reference to its user (phase 3) and assign the documents authentication level; viewable only or printed-version (phase 4). Even Gail M. Hodge agrees that "the project managers from the "cutting edge" projects emphasized the importance of considering best practices for archiving at all stages of the information management life cycle." [4] Acknowledging this important philosophy, the best practices identified by the study are presented in the framework of the information life cycle -- creation, acquisition, cataloguing/identification, storage, preservation and access.

## 2.3 Development of Digital Libraries

### 2.3.1 Issues on Development of Digital Libraries

Society has a vital interest in preserving materials that document issues, concerns, ideas, discourse and events. We may never know with certitude how many children Thomas Jefferson fathered or exactly how Hitler died. However, we need to ensure that documents and other raw materials, as well as accumulated works about our history survive so that future generations can reflect on and learn from them. The question of preserving or archiving digital information is not a new one and has been explored at a variety of levels over the last five decades.

Archivists responsible for governmental and corporate records have been acutely aware of the difficulties entailed in trying to ensure that digital information survives for future generations. Far more than their library colleagues, who have continued to collect and organize published materials primarily in paper form, archivists have observed the materials for which they are responsible shift rapidly from paper objects produced on typewriters and other analogue devices to include files created in word processor, spreadsheet and many other digital forms [5]

In the current timeframe, it is vital that an organization should digitally and electronically manage its' print information making it easier and accessible anywhere, at anytime. This is the reason why many organization turns to digital libraries in order to manage and preserve its print information. Most of the organizations nowadays have their own portals in order to accomplish this objective.

Referring to Gail M. Hodge statement, groups and individuals who did not previously consider themselves to be archivists are now being drawn into the role, either because of the infrastructure and intellectual property issues involved or because user groups are demanding it. Librarians and archivists who traditionally managed the life cycle of print information from creation to long-term preservation and archiving, must now look to information

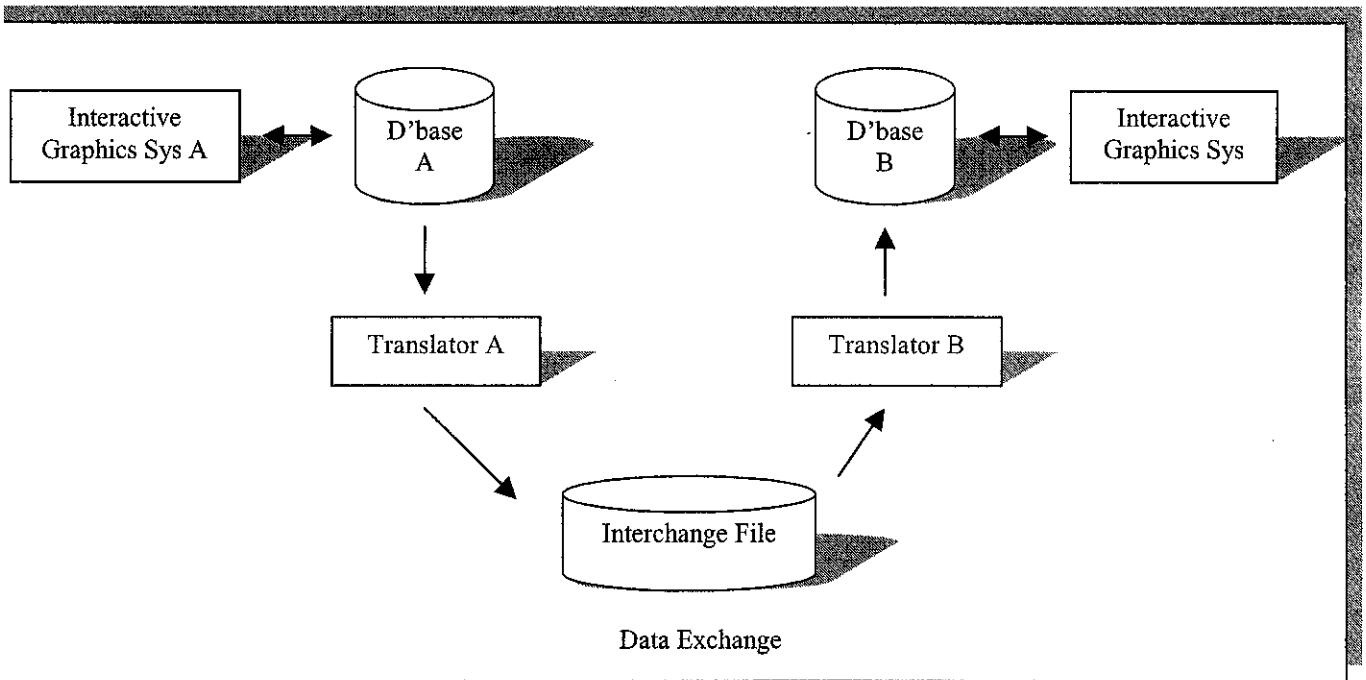
managers from the computer science tradition to support the development of a system of stewardship in the new digital environment. There is a need to identify new best practices that satisfy the requirements and are practical for the various stakeholder groups involved.

Digital technology, however, poses new threats and problems as well as new opportunities. Its functionality comes with complexity. Reading and understanding information in digital form requires equipment and software, which is changing constantly and may not be available within a decade of its introduction. Today, information technologies that are increasingly powerful and easy to use, especially like those that support the WWW, have unleashed the production and distribution of digital information.

Such information is penetrating and transforming nearly every aspect of our culture. If we are effectively to preserve for future generations the portion of this rapidly expanding mass of information in digital form that represents our cultural record, we need to understand the costs of doing so and we need to commit ourselves technically, legally, economically and organizationally to the full dimensions of the task. Failure to look for trusted means and methods of digital preservation would certainly exact a stiff, long-term cultural penalty. [5]

### **2.3.2 File Format Issue on Development of Digital Libraries**

For this project, file type conversion is crucial as the system is about storing documents and preserving it in a way that it reduces the risk of editing file activity as well as plagiarism. So in this project development, the file that would be uploaded would be stored in PDF format compared to the original format, DOC. To illustrate this process, an example on file format for data exchange between graphic databases will be used.



**Figure 3** File upload and conversion process on graphic databases

The basic process addressed by this specification is the transfer of data - content and structure - from one graphical database to an unfamiliar database having in general substantially different structure, conventions, and capability. The approach taken is in essence the definition of an intermediate database with basic data content and structuring capabilities. The intent is to include a large degree of flexibility to minimize the amount of intelligence lost in the translation process. Inevitably, however, each database transfer must involve considerable liaison and negotiation between the sender and receiver of data.

A number of instances are cited above where considerations external, to the interface file come in to play; interpretation of line symbology code, and use of the annotation and technical data fields are important examples. Many more have not been explicitly called out; consider usage of data type, level, and association groups. The goal is of course to have the data in usable and effective form in the target data base, and this can be accomplished only after detailed investigation of source and target system and database capabilities, followed by planned usage of the translators and interface file. [6]

### **2.3.3 Information Finding Issue in development of digital libraries**

In a digital library, one of the most challenging problems is finding relevant information. It is this emerging massive cumulative of varied information sources that will evolve into our digital library of the future. However, there is still one catch: before a “needle” of knowledge can be tapped by the end-user, it has to be found in the “haystack” of the world’s information sources. To illustrate, consider searching for information hidden among the millions of documents residing in the tens of thousands of gopher, WATS, and WWW sources available today.

Thus, one of the key questions for the digital library of the future is how to search over large numbers of distributed sources and locate the right sources to direct a search to. One of the solutions that can be used is “exhaustive match”; defined as the need to identify every single document in the sources that matches the query. For an exhaustive match, the options are not very attractive because one is to ship the query to all possible information sources. This generates an enormous amount of network traffic and load at the sources. In other words, every information source on the network would be processing every query generated anywhere on the network. Clearly, this approach does not scale to large numbers of sources.

Another alternative is to build a complete inverted index of all the documents. By searching in this index, we could match exactly the query to all relevant documents. The third strategy is to construct some type of document or index hierarchy. For example, documents on a particular topic would be stored on a fixed source. An alternative is to not partition the documents but the index. Thus, the query would be routed to the computer science index machine. It could in turn provide a list of all the documents that match, even though the documents could be on a variety of machines. Recent research activities in information dissemination (also known as information filtering and routing) include efforts to improve the filtering process and to support collaborative or social filtering. When used on a large scale, the efficiency (performance) aspect of the dissemination also needs to be addressed. [7]

### 2.3.4 Access Control Issue

This is also one of the crucial issues relating to the development of this project. It is concerned that the originality of the documents should be maintained and secured. It is also an issue that certain users only are given the option to access these documents in a sense that they can make modification to the documents. The next journal will discuss a bit on this issue.

Gladney stated "Efforts to place vast information resources at the fingertips of each individual in large user populations must be balanced by commensurate attention to information protection." For centralized operational systems in controlled environments, external administrative controls may suffice. For distributed systems with less-structured tasks, more-diversified information, and a heterogeneous user set, the computing system must administer enterprise-chosen access control policies. One kind of resource is a digital library that emulates massive collections of paper and other physical media for clerical, engineering, and cultural applications.

This article considers the security requirements for such libraries and proposes an access control method that mimics organizational practice. This is by combining a subject tree with ad hoc role granting that controls privileges for many operations independently, that treats (all but one) privileged roles (e.g., auditor, security officer) like every other individual authorization, and binds access control information to objects indirectly for scaling, flexibility, and reflexive protection. In principle, object access control is simply conformance to a rules array, which records the privileges allowed to each subject for each object. Such an array is, however, impractical for even a small library because of the human effort to manage it.

A *library* is a protected resource containing data sets called objects, documents, or items below (depending on the context) and a catalog, which locates and describes each item in one or more records. Thus a library is a specialized form of protected resource.

A *privilege* can be access to an operation or omission of some normally required validity check or audit trail addition. The rules for deciding whether any privilege can be granted and for combining privilege sets to determine whether to permit an action are the same for most privileges.

Roles are task-oriented relationships, which recur within a community; examples are “is secretary to” and “is auditor for department.” A *role* is a set of privileges required to accomplish a related set of tasks and is represented by a named bit vector. For instance, a *store administrator* allows subjects to connect to the store, defines their privileges, and administers some basic access control information; the custodian grants the privileges needed to meet these responsibilities to each store administrator, who is distinguished from other subjects only by having certain privileges not commonly granted. [8]

This issue have been looked into and applied to the project development concept. For this project, the system 1<sup>st</sup> level administrator will be responsible to allocate the access control to its users while other user that surfs the library just to search documents won't be given any access as this is an effort to maintain the database security.

## **2.4 Project Development Methodology**

Although the development of web-based applications made many improvements, there is still a lack of an established software engineering methodology for constructing web-based systems. Consequently, much of the development is carried out without a true understanding of analysis and design issues. Currently, the problems of developing web-based systems are similar to those in traditional software engineering thirty years ago where programming and performance were the main issues. [9]

Model driven development methodology emphasizes on the drawing of models to help visualize and analyze problems, define business requirements, and design information systems (See Appendix C for MDD Methodology Diagram). This approach takes on the appearance of a waterfall, suggesting that phases must

generally be completed in sequence. In this approach also it is possible to back up to correct mistakes or omissions; however, such rework is often difficult, time consuming and costly. There are also several disadvantages of model-driven development. Most often cited is the long duration of projects; it takes time to collect the facts, draw the models and validate those models.

This is especially true if users are uncertain or imprecise about their system requirements. The methodology also is considered by some to be inflexible; users must fully specify requirements before design; design must fully document technical specifications before construction; and so forth. In response to the faster pace of the economy, rapid application development has become a popular route for accelerating systems development. This technique emphasizes on extensive user involvement in the rapid and evolutionary construction of working prototypes of a system to accelerate the system development process.[10] (See Appendix C for RAD Methodology Diagram)

The specified timeframe for the development of this FYP Digital Library is only around 11 weeks. With limited timeframe and limited knowledge on this kind of system development, it is deemed that by applying the rapid application development methodology to the project methodology is the best decision and most suited the project. Another reason for this choice is that this type of methodology actively involves the system users in the analysis, design and construction activities. This is good practice for this project as the basic concept of this project development need extensive user involvement in almost all the project phases.

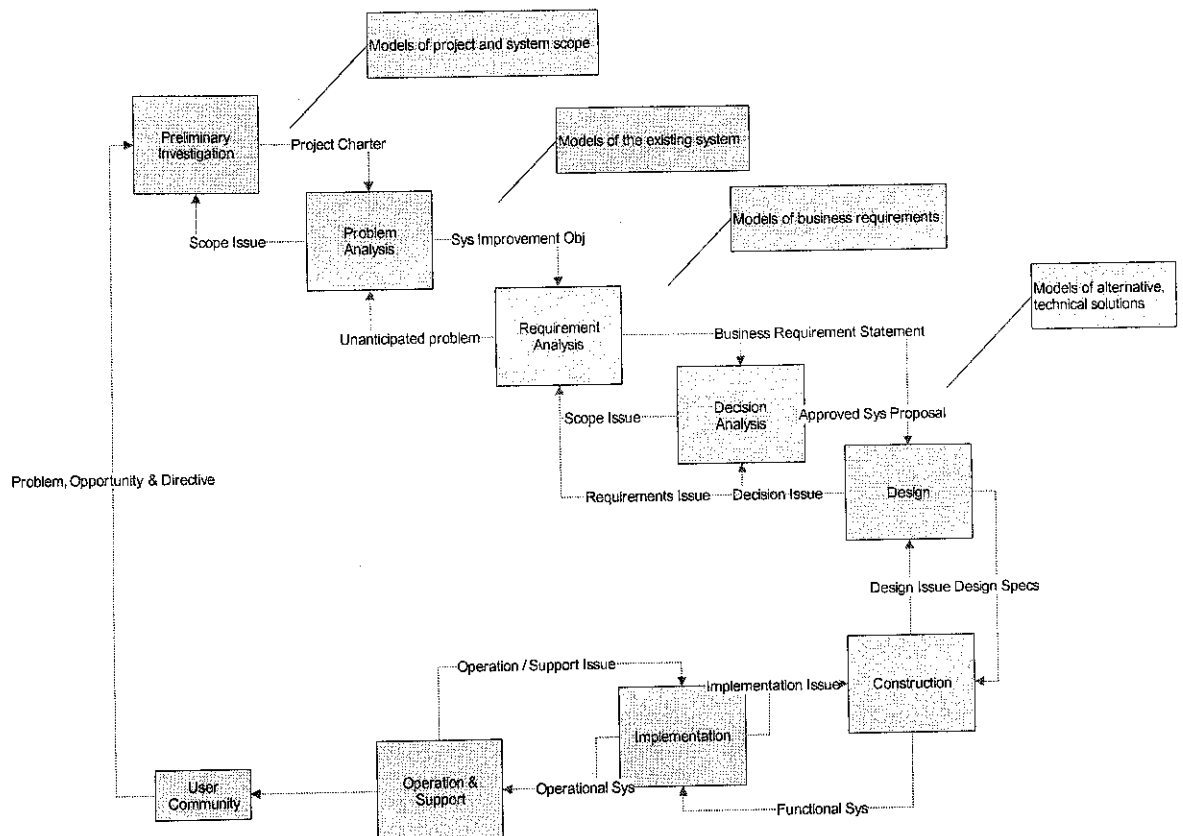


# CHAPTER 3

## METHODOLOGY / PROJECT WORK

### 3.1 Model-driven Development Methodology

For web development, it has always been using the model-driven development methodology. It is one of the oldest and most commonly used approaches to analysing and designing information systems is based on modelling. In this methodology, system models are used to illustrate and communicates data, process or interface building blocks of information systems. This methodology emphasizes the drawing of models to help visualize and analyse problems, define requirements and design information systems. The model driven route takes on the appearance of a waterfall suggesting that phases must generally be completed in sequence. With this methodology, it is possible to back up to correct mistakes or omissions; however, such rework is often difficult, time consuming and costly. (See Appendix C for MDD Methodology diagram. [Figure 4])



**Figure 4** MDD Methodology Diagram

ill-advised shortcuts through the methodology. With enough timeline and well-planned scope, these faults however can be overcome.

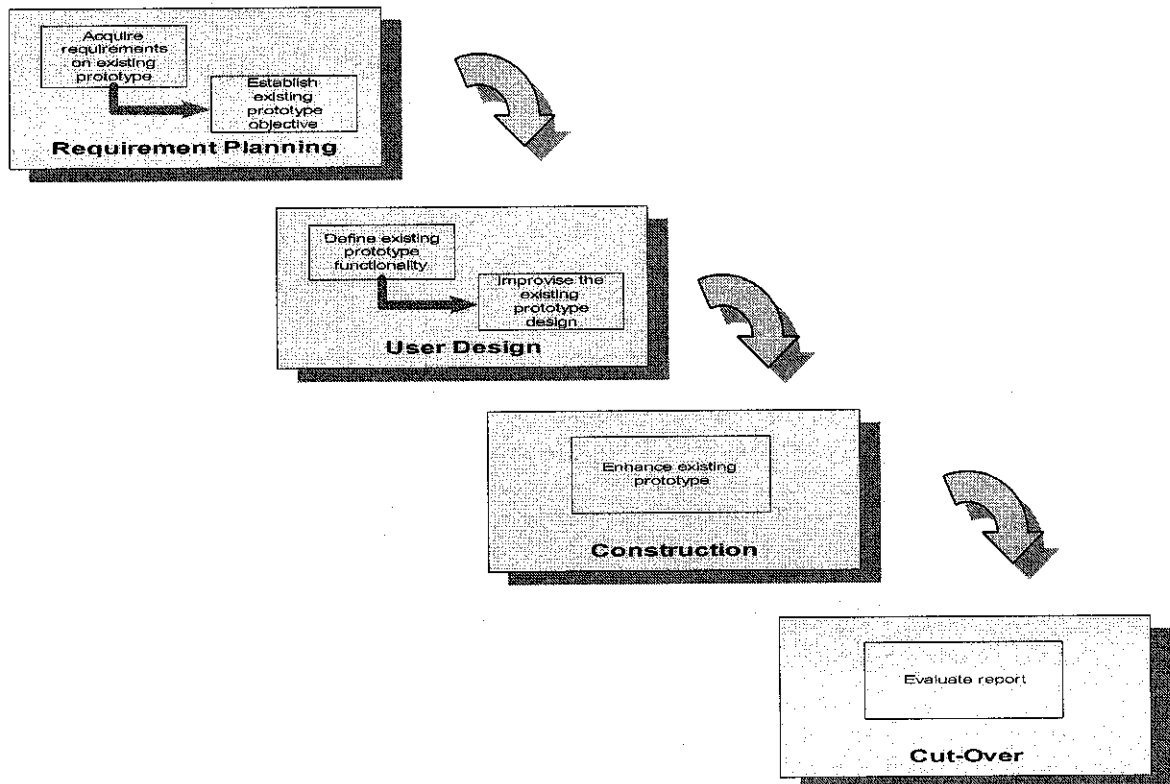


Figure 5 RAD Methodology

### 3.2.1 Procedure Identification

By developing this project based on the RAD methodology, the project development phases would have to adhere to the phases defined in the methodology. (See Appendix C, Figure 6 for detailed version of system methodology)

#### 3.2.1.1 Requirement Planning Phase

In the first phase, which is the requirement planning phase, it is divided into two small phases; preliminary investigation phase and problem phase. In the preliminary investigation phase, the desired scope of topic is identified and later project proposal is prepared and approved. However, if the proposal is rejected, then a new scope of topic will be searched and assigned to. Next, a short study is done on the new assigned topic and the specific project scope is

determined and its requirements are gathered. A preliminary report on the topic will be produced.

In the next phase, problem phase, a feasibility study of the project is done and the problem will be analysed and reviewed with the project requirement. Requirement analysis and specification document is prepared as well as data, process and project modelling is created. Finally, a progress report is produced.

### **3.2.1.2 User Design Phase**

In the third phase, the user design phase, in which the iterative phases start to occur; the design phase indicates that revision of the system requirement and incorporation of feedback on the system is implemented. Next system architecture is designed in which the flow of the system is designed and produces UML diagrams, etc as its documentation. Next, database structure for the system is designed by reviewing with the previously created data, process and object modelling. (See Appendix D for UML diagrams and database structure of the system.) Lastly, interface of the system is designed in which the image editing and web page design enhancement is carried out. Finally, all the designs are reviewed against the systems requirements to ensure that it is correct and satisfy the stakeholders' demand as well as enabling any amendment to be made from time to time.

### **3.2.1.3 Construction Phase**

In the fourth phase, the construction phase, database and administrative functions are created which is defined as creating tables in the MySQL database server for documents storage as well as user authentication. Next, the system web interface is developed or programmed. If there is any amendment to be made, then modification and retest is done on the system designs.

### 3.2.1.4 Cut-Over Phase

In the final phase of the methodology, there are still three small phases; the implementation, analysis and final implementation phase. In the implementation phase, unit and system integration testing activity is carried out. First, test plans are created based on system requirement. First, unit testing is carried out. Unit testing is testing activity done on modules in the system before it is compiled into a whole system. Tests are performed on the database and administrative functions as this is considered as the crucial part of the system. Next, test activities are done on the system's web interface. If there is any fault in the unit testing, then recoding is done and retested.

Next, the units of the system are compiled into a whole system and tested. This test activity is identified as system integration testing. Test is carried out on the system as a whole in order to identify any fault in the system. The reason why unit and system integration testing is done separately is because if there is any faults in the system when compiled as a whole system, then the debugging and recoding units is much easier compared to done on the system as a whole. However, there can still be bugs in the system. So modification to the code is done and the system is retested.

In the sixth phase, the final phase in the iterative phases is the analysis phase. This is the phase when all the reviewing and modification activity is carried out. The activities that are identified under this phase are project requirement review, reviewing the system design with project requirements, modifying and retest activity on system designs, modification and retesting activity on unit and system integration tests.

Final phase in the RAD methodology is identified as implementation phase, which is out of the iterative loop phases. In this final phase, user will approve the final system based on the agreed upon project requirements and the system will then be hand-over to the user. However in some projects, there are cases in which projects implement the last phase in the methodology, which is the operation and support phase. In this phase, system closeout will

be done and user documentations or manuals is produced and submitted to the user. In this project, the user documentation that will be produced is supervisor's final draft, final draft, dissertation and finally, system presentation.

### **3.3 Development Tools**

For the development purposes, the tools that will be used are now finalized and development phase will start immediately after installation of primary server as well as backup server is completed. The project is to be developed using a combination of the latest technology in application development which includes Apache as the web server, PHP as server-side scripting language, client-side scripting language JavaScript, XHTML, Macromedia Dreamweaver MX as interface development tool, free PHP PDF module for .html file type conversion to .pdf file type function, Adobe Acrobat Reader to read document searched, Adobe Photoshop, Microsoft Office, Microsoft Project as well as MySQL database. These softwares will be installed in a Unix based PC that acts as the system web server.

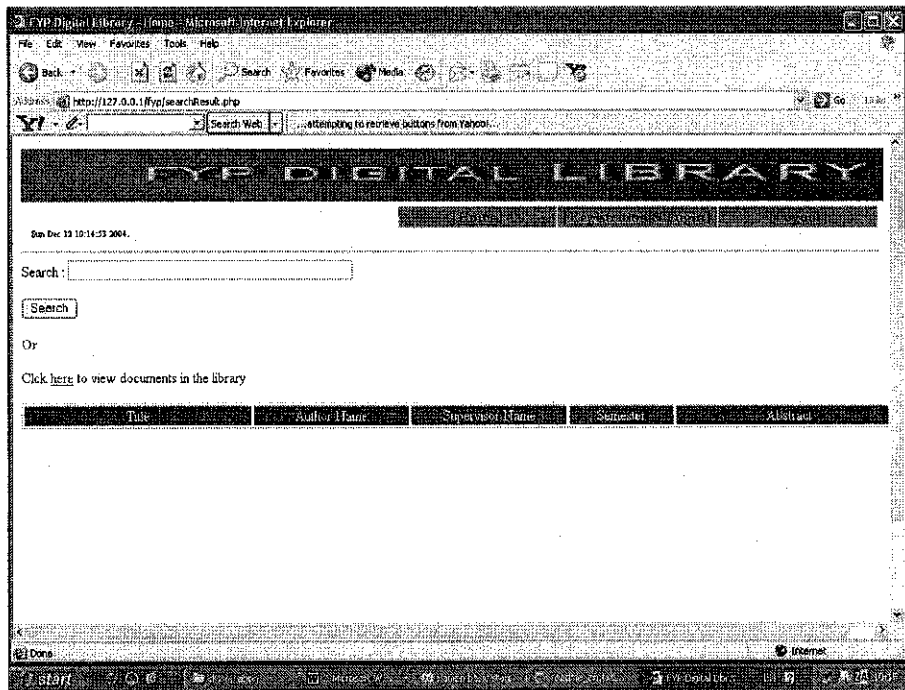
## CHAPTER 4

### RESULTS AND DISCUSSION

#### 4.1.1 Results

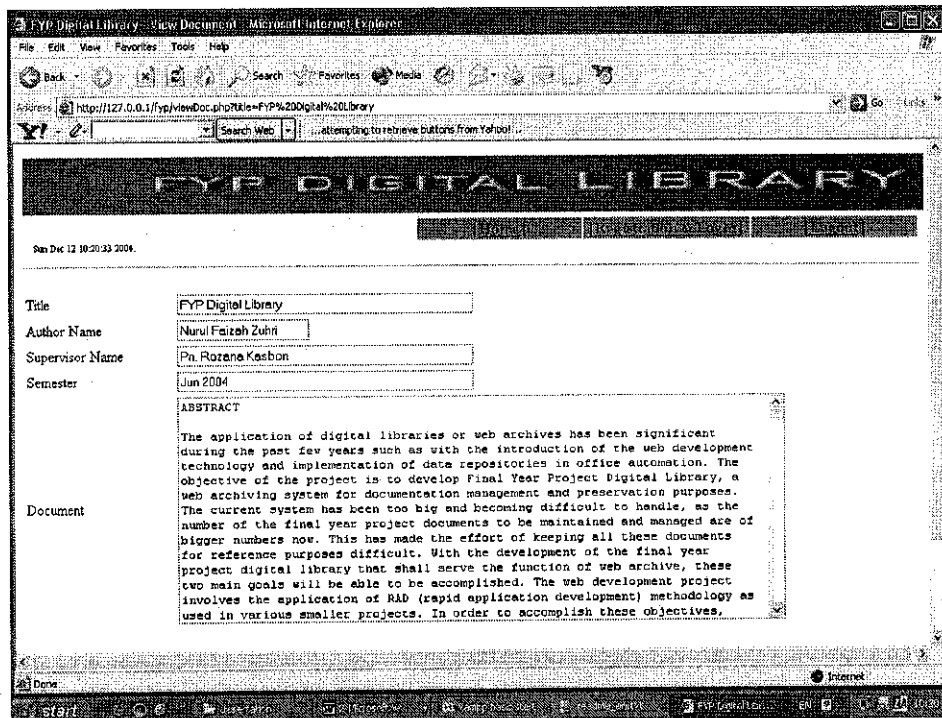
As a result of study and research on digital libraries and file type conversion, this is the end result of this final year project. This system will be used by three main users, its general users which stands of anyone linked to the local area network may it be students, even lecturers; next, registered users consists of final year students and supervisors for final year projects and finally system administrator; IT Department staff held responsible to administer the digital library. The user of this library would only need access to it if they would need the privilege to upload documents to the library. If user basically just wants to search for documents in the library, they wouldn't need user account in the system. They just need to login into the system and they can straight away use the system.

The figure below shows the default main page of the system. User will be directed to this default page each time they click on the library's URL (<http://127.0.0.1/fyp/home.php>). At this page, user will be given two options to search for documents available in this system. They can either search for the documents via searching using keywords or by clicking on a link to view the list of document titles that is available in the system. They can decide whether or not to view the document by reading the documents' abstract provided along with the other details of the document. To view these documents, they can just click on the title of the documents. On this page, user will be presented with three options into the system, Home; where the user will be redirected back to this default system page, Registration & Login; for user to create new accounts with the system and also for authorized user to access into the administration part of the library and Logout; for authorized users to logout of the library's administration section as well as close the window itself.

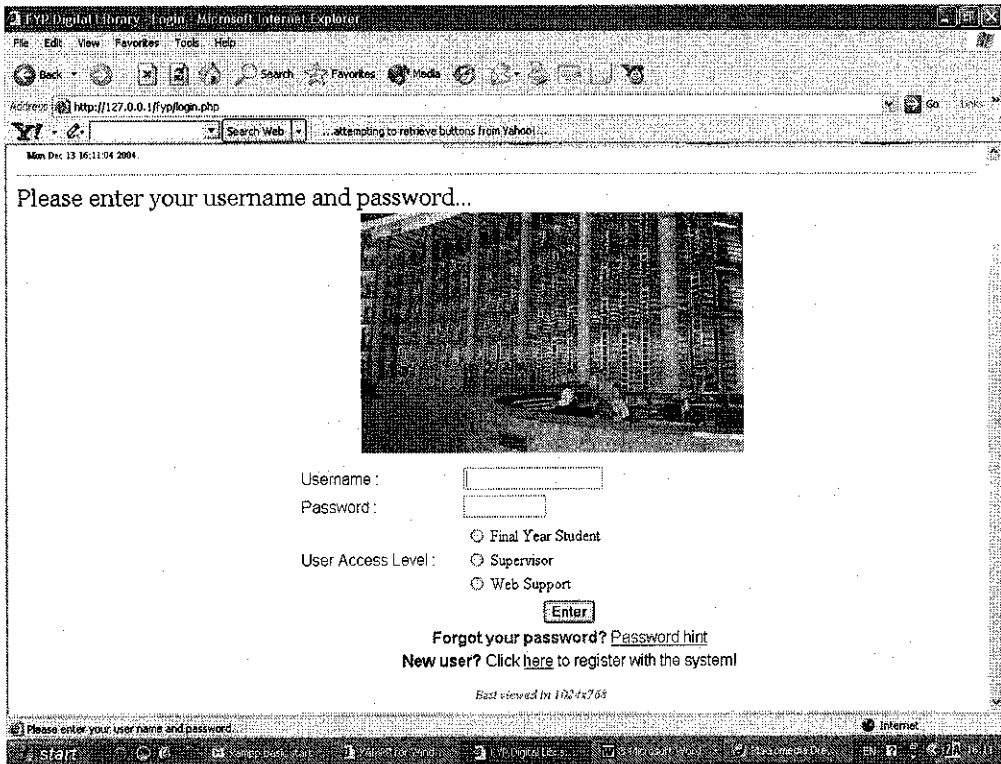


**Figure 9** FYP Digital Library Default System Main Page (HOME)

The figure below is the default page that the user will be redirected to when they click on the document title. User will then be redirected to this page where they would be able to view the content of the document. This page however is supposed to be viewing the content of the document in a .pdf format.



**Figure 10** FYP Digital Library view Document page



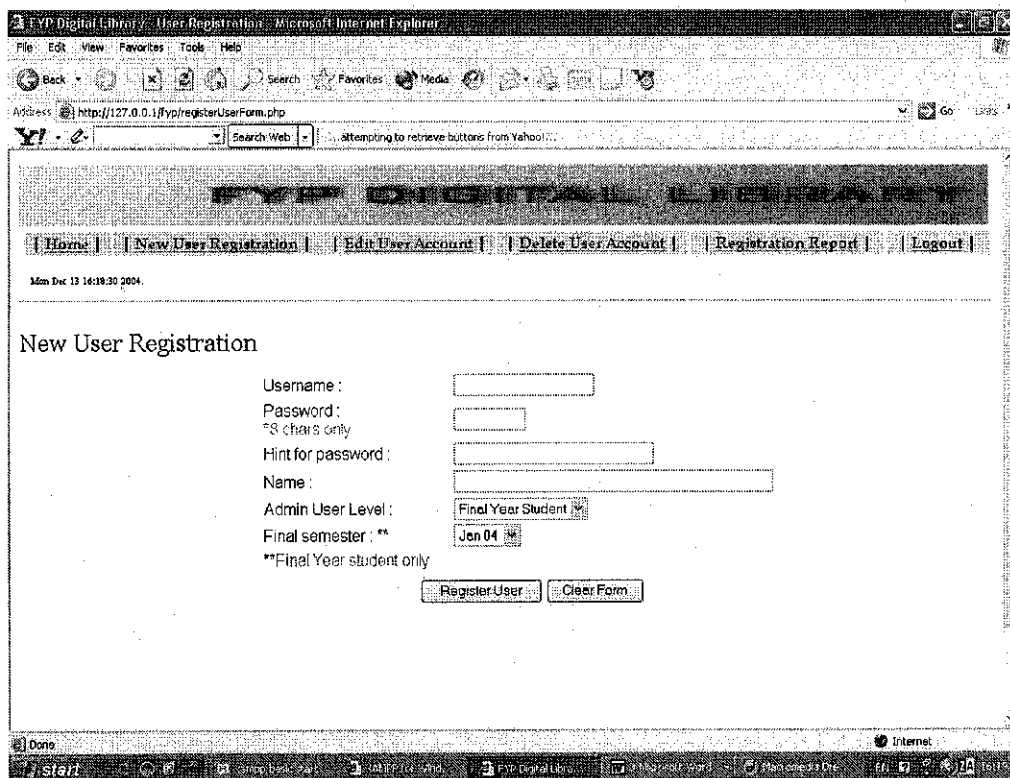
**Figure 11** FYP Digital Library Login Page

The figure above shows the system login page where authorized users need to verify their account info before they are granted access into the system. For this system, user accounts are granted only for final year students, FYP supervisors as well as system administrator appointed by the system custodian and these accounts are managed by the web support administrators. This is because users who intend to search for documents only do not need to have an account registered with the system. These accounts are only needed for document storage and management as well as managing the system only.

The system login page will then identify the user access level to the system has been granted and from here, the authorized users will then be redirected to their respective pages. In this system, web support level users are granted the privilege to control user accounts in the system. Upon logging in into the system, web support level administrators will be redirected to the systems' new user registration form page. The figure below indicates the system new user registration form. Users that want to



register with the system is can also view this page but they are only offered only a few menu access at the top of the page, compared to the system administrators.

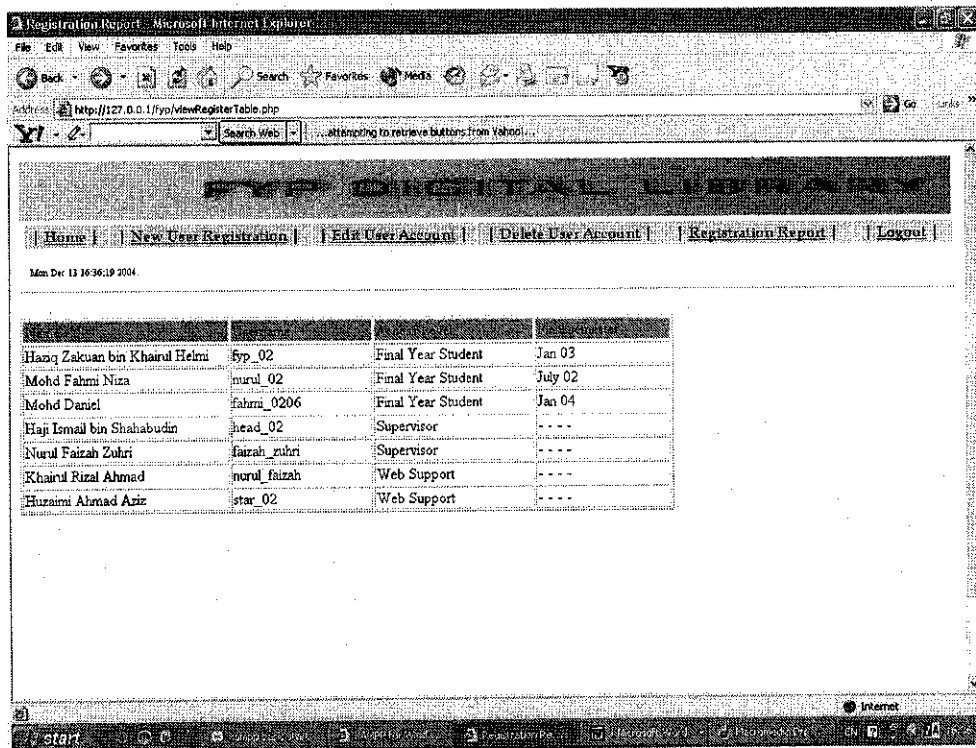


**Figure 12** New user registration form

Upon completion of the user registration form, the user or system admin will then be prompted with a pop-up window indicating that the user account has been added to the system database registry. The system also allows the web level admin support to edit any account that exists in the system registry. By clicking on the name of the user account, the web level admin can then view the user account. Upon completing edit of the user account, web support level admin is then prompted that the account has now been edited.

The web support admin also has the privilege of deleting any unwanted user account in the system. First by clicking on the delete user account link available in the menu bar, then the system admin will then be redirected to a page indicating the list of user accounts available in the system. By clicking on the name of the user account owner, web support admin will then be redirected to a page listing down the user account details, prompting whether or not the admin want to delete the account from system

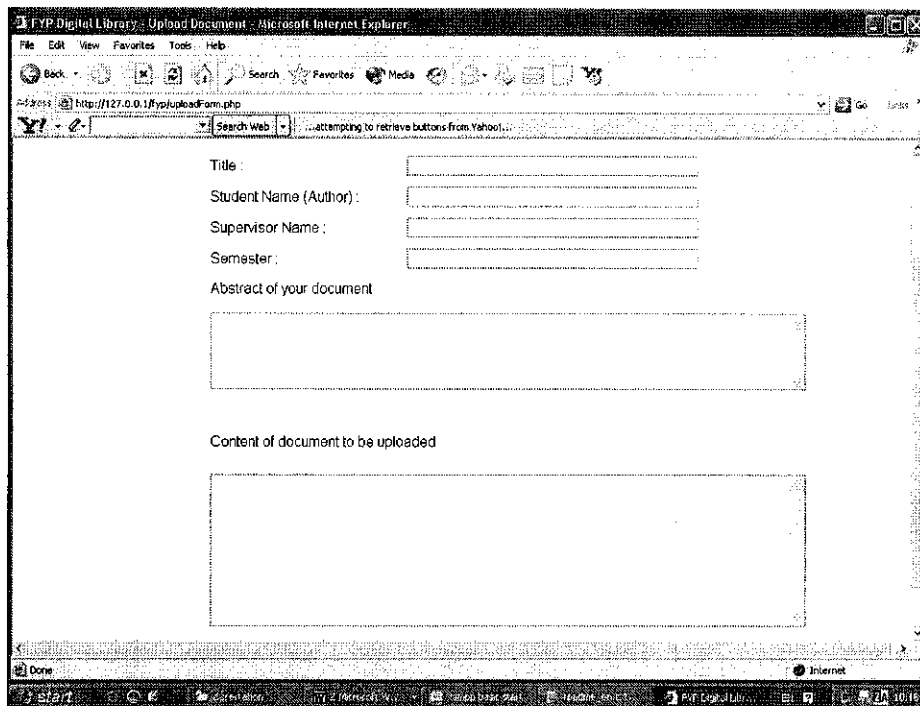
registry. Upon clicking on deleting the account, admin will then be prompted that the account has been deleted.



**Figure 13** View User Registration Report page

The figure above shows the view user registration page where the system administrators can view list of user accounts that is available in the system. This page enlists all the usernames, level of access, names of the user that has been registered to the system and also for the final year students that are registered to the system, the semester they are taking the FYP; final semester.

The system also caters for second level access administrators enabling them to upload documents to the digital library system. Upon successful login to the system, this type of authorized user will then be redirected to the page as shown in the figure below where they are presented with a form to upload documents into the system. in this page, the user would have to key in details of the documents as well as abstract of the document.



**Figure 14** Upload document page

The system also allows these authorized users to edit any document that exists in the system. By clicking on the title of the document, the authorized user can then view the document. Upon completing edit of the document, the user is then prompted that the document has now been edited.

These users also have the privilege of deleting any unwanted documents in the system. First by clicking on the delete document link available in the menu bar, the user will then be redirected to a page indicating the list of documents available in the system. By clicking on the title of the document, they will then be redirected to a page listing down all the document details and content, prompting whether or not they want to delete the document from the system. Upon clicking on deleting the document, user will then be prompted that the document has been deleted.

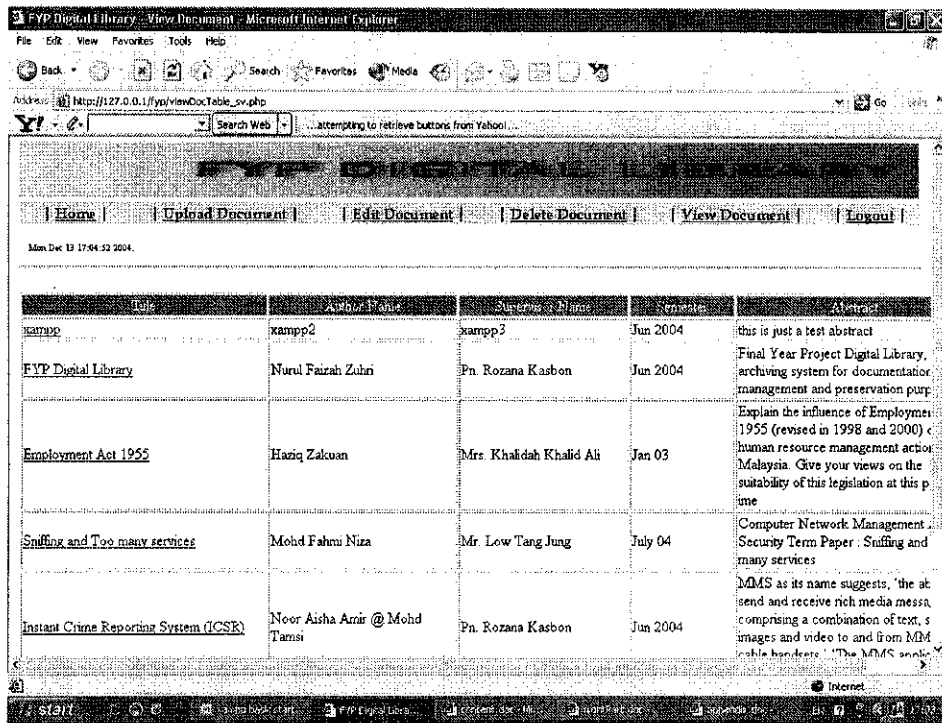


Figure 15 View Document list page

As shown in the figure above, this is the page that will be viewed to the authorized user to enable them to view the list of documents that is currently available on the system. To be able to view the documents, these users would just have to click on the document title which will link them to the document view page as shown in the figure below.

Upon completion of administration tasks in the system, system administrators can log out of the system by clicking on the logout menu available in the bar menu. By clicking this, system admin will then be redirected to the page as indicated in the figure below. By clicking on the "Yes, sign me out" button, registered user will then be redirected out of the system in which the system window will then be closed but if the system admin decides to cancel his / her action, then the system admin will then be redirected back to the previous page that he / she had just viewed. This is indicated by the figure below.

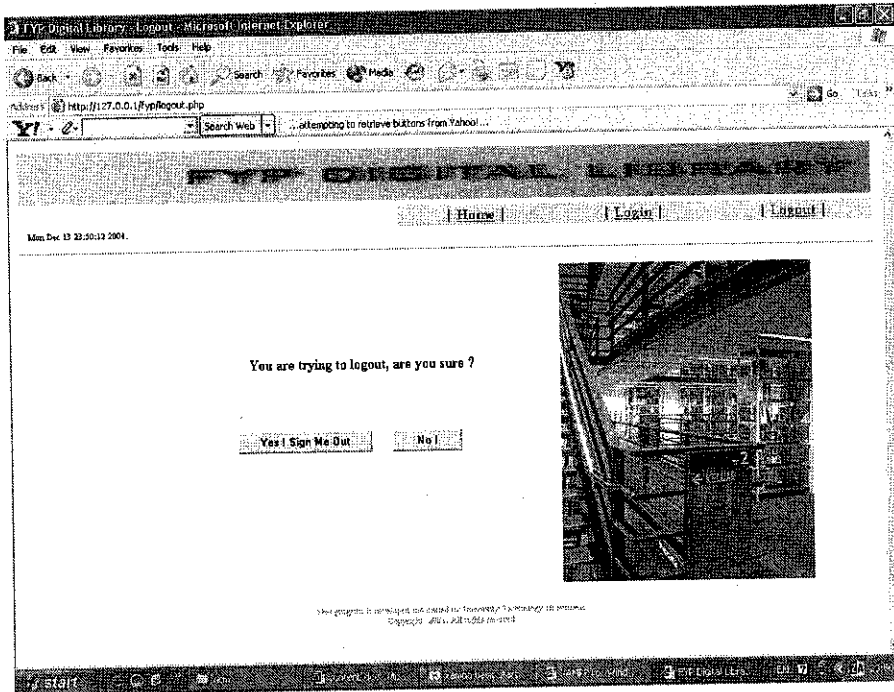


Figure 16 System logout page

#### 4.1.2 Findings : Digital Libraries on the market (System Study)

For this purpose, I did some comparison with existing digital libraries that can be found via the Web and I have stumbled upon ACM Digital Library. During this system study, I noticed that there are a few limitations to the system that in order to meet up with the standards of existing digital libraries in the market, modifications would need to be carried out. First and foremost, the figure below shows a snapshot of the digital library that has been used in this system study. More snapshots of the system are available in Appendix F.

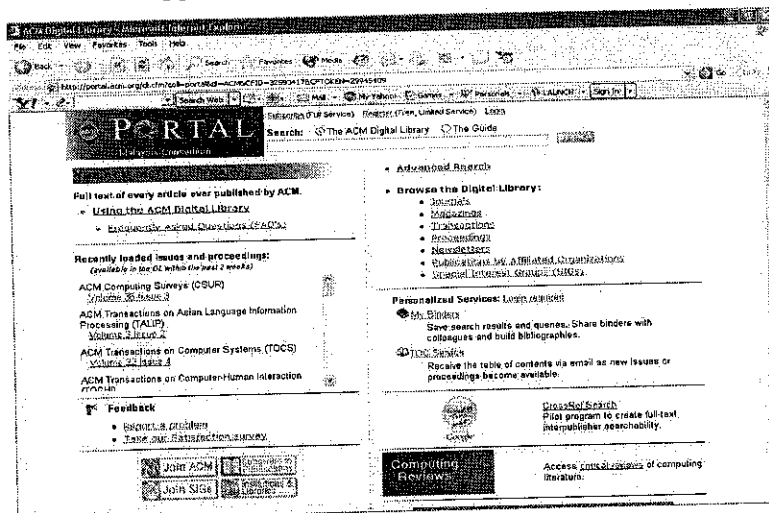


Figure 17 ACM Portal Main Page

By referring to the above figure, we can see that the system offers a lot of options for user to search documents in the system. User can search according to different type of documents, any keyword, etc. it also offers to the user the option to report any difficulties or feedbacks on the system. It also provides the user on user manuals or FAQs relating to the system. The system also offers two type of service subscription, i.e. subscribe to the full service system or register for free, limited services. The library also caters for document viewing of PDF format files.

To use this digital library, user would have to have at least a registered account with the system in order to use the basic, limited services. After logging in to the library, user can search for their desired documents and they will then be given a list of documents having high relativity to the keyword searched. By clicking on the links on the document title, the user will then be redirected to a page where the user can read the full abstract of the document and also an image of a PDF file of the document to download and view the document.

From my research and study of the ACM Digital Library, I can see that the system caters for document searching via multiple data repositories and can be indicated to be using the document or index hierarchy document search method. This can help to produce more results for document search and improve the response time for each of the query made on the system search engine. This digital library also serves the objective of document management and maintenance, information finding and searching as well as serves its main objective, to serve its users as a reference point.

By comparing the developed system to this digital library, I can say that the system still needs to be modified as to match to the standards set by existing digital libraries in the market. Most importantly, this system would have to be modified so that it can support document viewing in PDF formats. As most of the FYP documents is produced using Microsoft products' such as Microsoft Office (Word, Excel, Access, etc.) and PHP doesn't support .DOC file conversion to .PDF files, it is advisable that the system is developed using ASP as this programming language supports all Microsoft's product. If this is achieved, the main purpose of developing a digital library is then solved. Therefore, it is important to identify what are the most suited tools to be used in developing the system during the requirement planning phase.

## 4.2 Discussion

Looking at the functionalities that is served by the current developed system, the simplicity of the system is basically enough to accomplish the system objective that is documentation management and preservation purposes. The idea of the system is seen to be feasible as it can be applied via the university's local area network and utilizes the current technology available in the campus. By applying this system into the current university's situation, many individual can benefit from the system itself as it can be referred to as reference centres on FYP documents and made accessible to anyone connected to the university's LAN.

Apart from that, this system can be beneficial to the university's library as it no longer has to store all the reports in hard copies as it now can provide online services to its library users. By having the online services in the library, library users as well as other users wouldn't have to worry about the report being unavailable on shelf, etc as they can access the document via LAN at any point connected in this campus. In a way, the university's library will now have more spaces to shelve all the new books available in the market apart from having to allocate all those spaces for the FYP reports.

Also by having this system online in the university's environment is that the concept of FYP Digital Library not only can be utilizes by the IT and IS departments but also by any departments or fields available in the university. As the concept of the library is very simple, the university management wouldn't have to incur any cost of implementing the system as user can easily grasp the administration concept of the system. By applying this digital library concept to the whole university, communication and reference activity is made simpler as the documents can be accessible by any individual in the campus. Whenever the lecturer need its supervisee to view a report as reference to his / her project or experiment theories, neither the lecturer nor the student need to go through hardship in tracking for the related document. The document is now available at anytime, anywhere and for any purposes via the digital library.

Finally, with the implementation of the digital library in the campus, the university will then be able to improve more on its current image and reputation may it be in the tertiary education sector or in the view of the local community. This is

because the digital library concept applied in higher education institution is still new and highly technology. Moreover, most of the institutions view this practice as costly without looking at the benefits that outweigh the cons of the system implementation.



## **CHAPTER 5**

### **CONCLUSION & RECOMMENDATION**

#### **5.1 Conclusion**

This project is developed using the current web development technology that is PHP and MySQL as its database to store the documents in the digital library. This system caters for three type of user; system admin (supervisors and staff) and general user (student and lecturers). The library is basically about documentation management and preservation purposes. As the current document management system is becoming more difficult to be handled, the idea of this FYP Digital Library is developed. This system caters only documents related to FYP documents specifically final dissertations submitted upon completion of the project development. By developing this library, not only the documents can be managed more easily and preserved but also made accessible to any individual in the university who needs it as reference material. With the development of the library, user wouldn't have to worry about the report copy being in bad conditions making it difficult to be used, user also wouldn't have to worry about the report copy being unavailable due to other user borrowing it from the repository. This system made it easier for all parties in UTP; library management, students who need reference materials for their FYPs, lecturers doing research on fields ventured before in previous FYPs, etc. Apart from that, by applying this digital library concept to the UTP environment, it will be seen as an act to meet up with outsiders' expectations on the level of technology and facilities in the university to the current modern and futuristic image of UTP.

#### **5.2 Recommendation**

There are several recommendations that can be made for future enhancement of the research area and also to the FYP Digital Library which are :

- Bigger search area and multiple search result to the user

As per current FYP Digital Library, the user has to select out of the list of documents available in the system and is not able to search via keyword which is mostly applied in most search engines. For future enhancement of

the system, FYP Digital Library is to allow users to search via keywords and be able to retrieve the documents which have related keywords to those being searched.

- .doc to .pdf file type conversion

Current file type conversion that is catered by FYP Digital Library is from HTML forms to PDF formats. As it is supposed to allow the system administrators to browse their local machines to search for the file to be uploaded which should be in .doc formats, the current system only allows for the admin to upload the document via HTML forms that is by command copy and paste document contents to the form and uploading it to the database. As future enhancements to the system, the system should allow system admin to browse local machine for .doc file to be upload and this file will then be converted to .pdf file behind the process, made invisible to the user.

- Securing document copyright

In the current system, user is only allowed to view the document content via HTML form. By doing this, copyright of the document is unable to be maintained as user is able to copy the document's content by right clicking on the document view to copy the text. As an act of securing the documents copyright, the document view page should disable the option to copy the document content via any option at all.

## REFERENCES

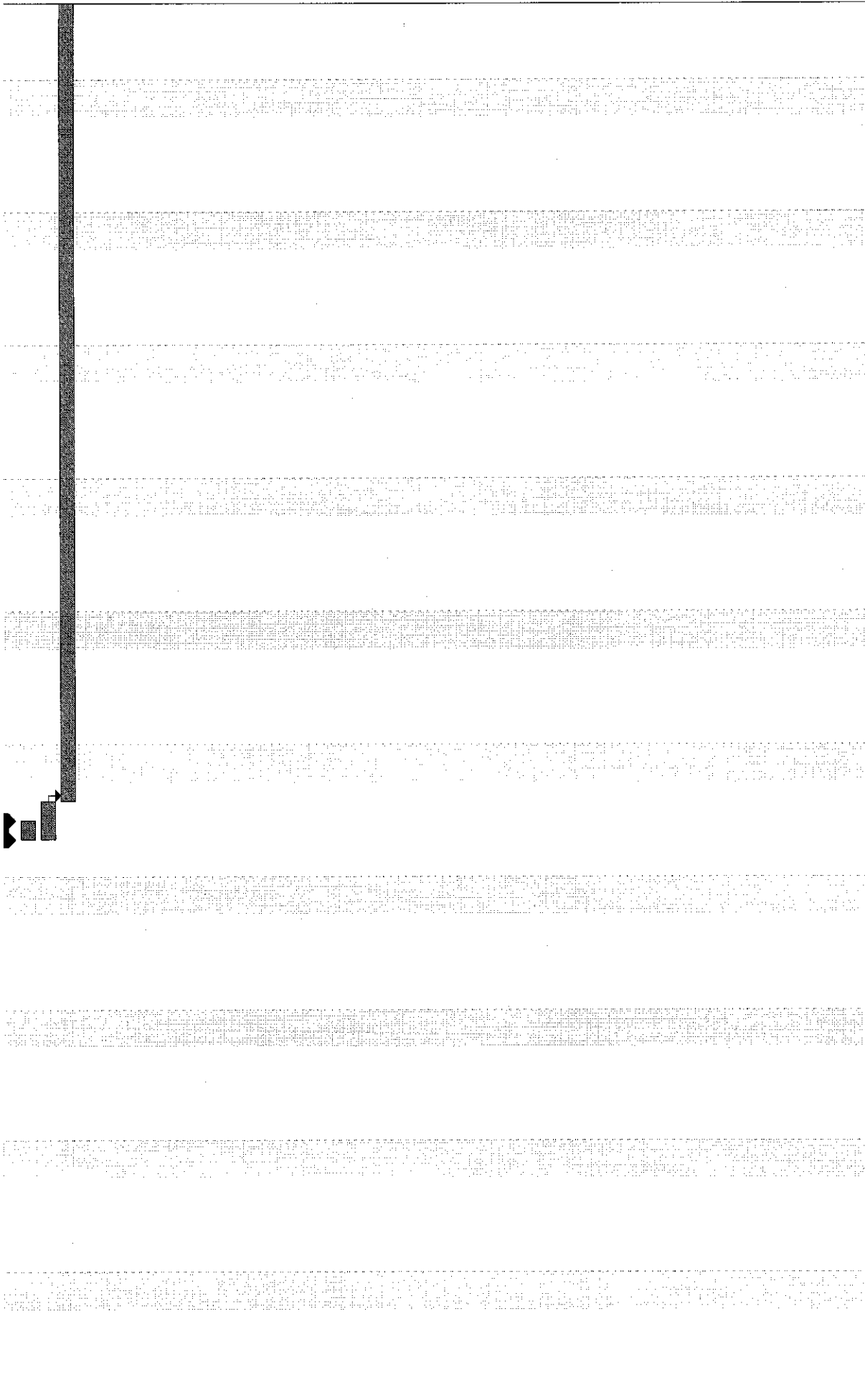
- [1] Xavier Spriet, "Real-World PHP Security", Linux Journal, 1 Apr. 2004, 7 Aug. 2004 <<http://www.linuxjournal.com/article.php>>
- [2] Fielding, Taylor, "Principled Design of the Modern Web Architecture", Day Software and University of California. 17 June 2002, 30 Aug. 2004.
- [3] Beverly B. Zimmerman, "Applying Tufte's Principles of Information Design to Creating Effective Web Sites" Brigham Young University, 18 Dec. 97, 30 Aug 2004
- [4] Gail M. Hodge, Consultant to the International Council for Scientific and Technical Information, Information International Associates, Inc., "Best Practises in Digital Archiving : An Information Life Cycle Approach" in *D-Lib Magazine* January 2000, Volume 6 Number 1. 24 July 2004
- [5] Garret, Waters. "Preserving Digital Information: Report of the Task Force on Archiving Digital Information." 1 May 1996, 21 Jul. 2004 <<http://www.rlg.org/ArchTF/tfadi.index.htm>>
- [6] Arthur G. Gross, "FILE FORMAT FOR DATA EXCHANGE BETWEEN GRAPHIC DATA BASES" <<http://www.acm.org/dl>> 6 Sept 2000, 31 Aug. 2004
- [7] W. Yan, Garcia-Molina, "Information Finding in a Digital Library: the Stanford Perspective" Department of Computer Science, Stanford University. 2 Nov. 2000, 30 Aug. 2004
- [8] H.M.Gladney, "Access Control for Large Collections", IBM Almaden Research Center. 31 Aug. 2004

- [9] Said Hadjerrouit. "Web-based Application Development: A Software Engineering Approach" Agder University College 3 Sept. 2002, 25 July 2004
- [10] Jeffrey L. Whitten, Lonnie D. Bentley, Kevin C. Dittman 2001, *Systems Analysis And Design Methods*, new York, McGraw-Hill Irwin

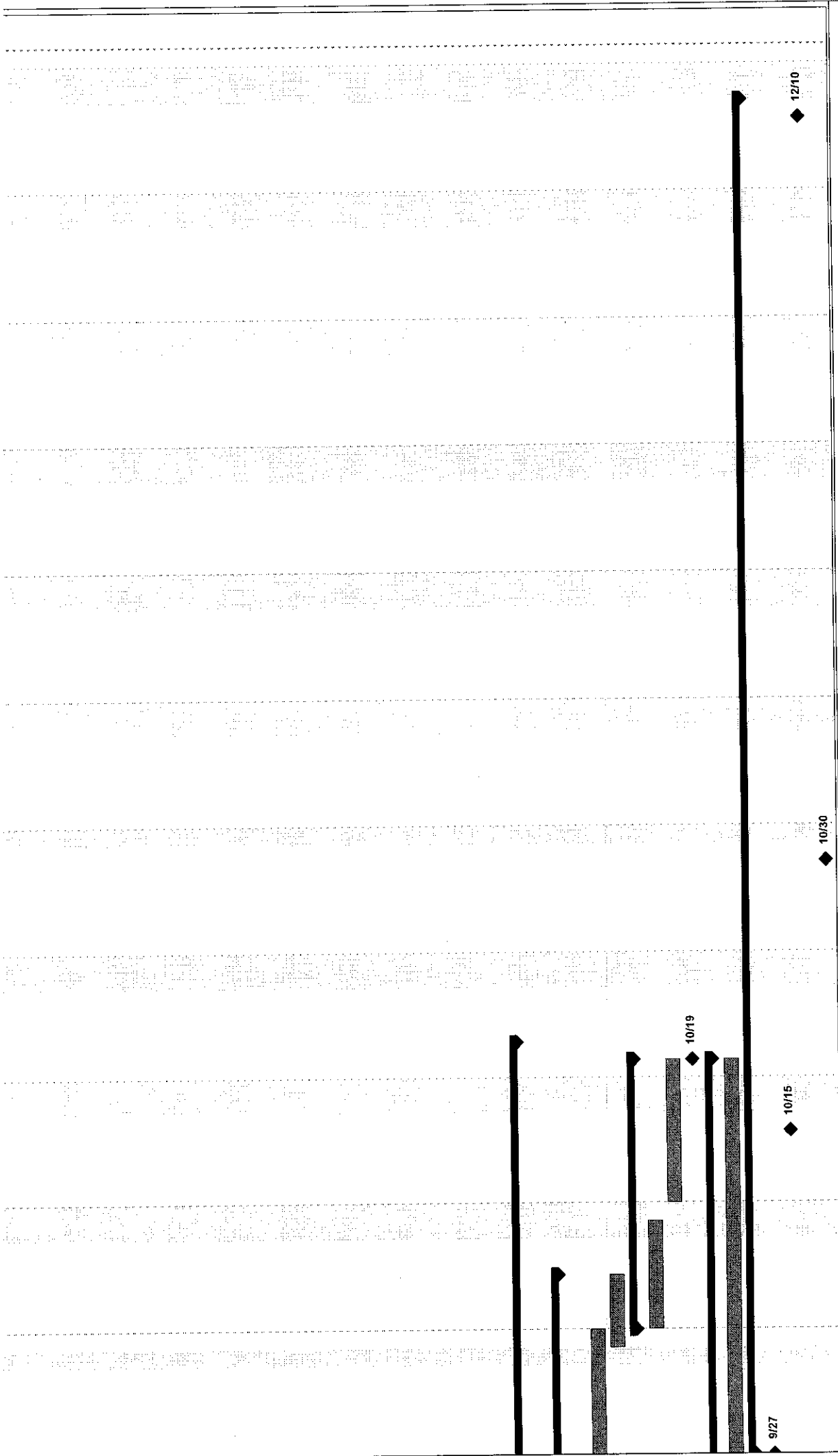
## **APPENDICES A**

### **FYP DIGITAL LIBRARY SYSTEM GANTT CHART**

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Task Split

Progress Milestone

Summary Project Summary

External Tasks External Milestone

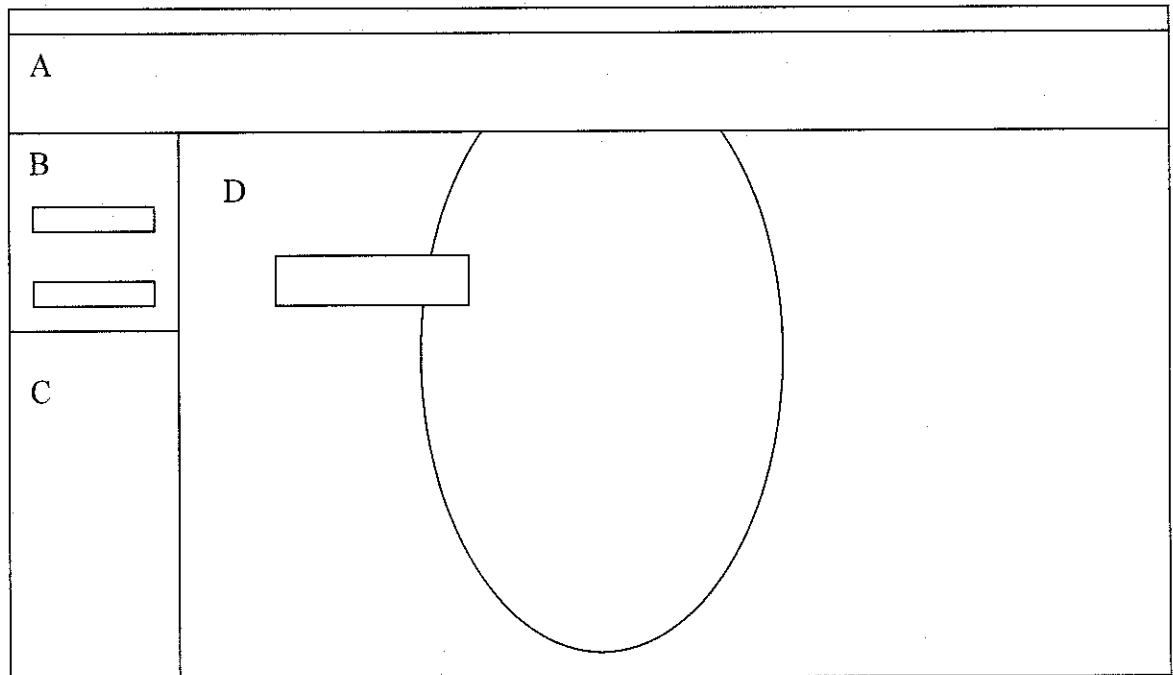
Deadline



## **APPENDICES B**

# **FYP DIGITAL LIBRARY STORYBOARD**

## Search page (Default Main Page)



### Description

A : Banner (consist of pictures on UTP's surrounding)

- Have date and time counter

B : User (Administrator) Login area

- Text : Username & Password
- Text fields (each attribute 1)
- Button : Go!

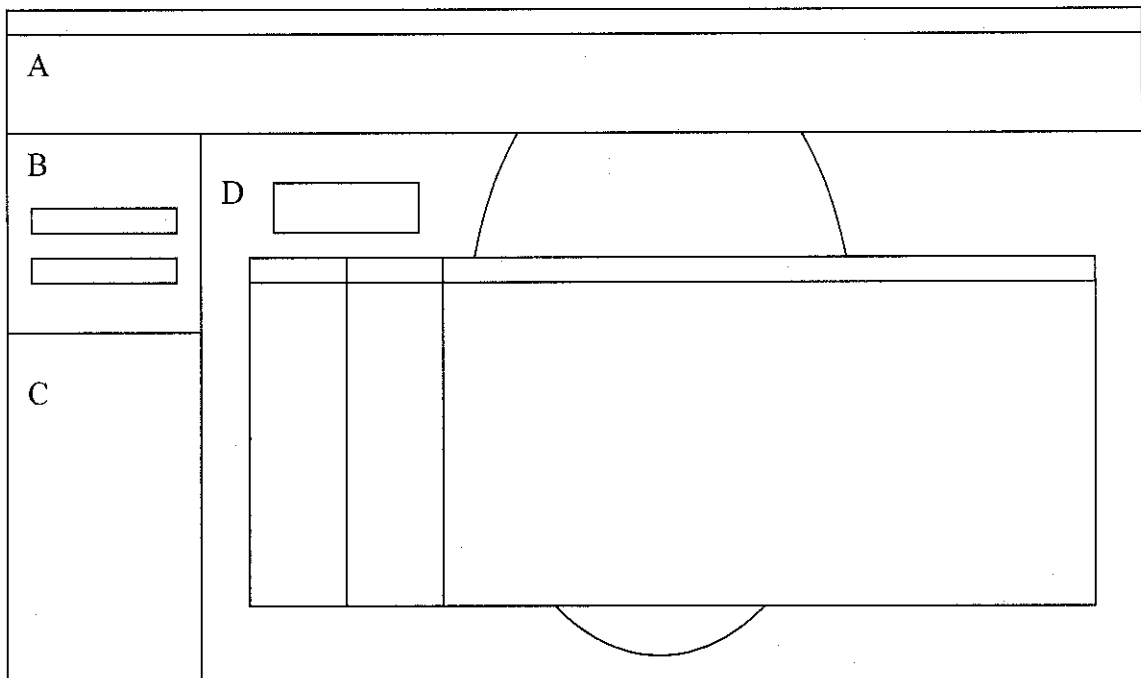
C : Main Menu (links)

- User registration
- Menu on this section changes according to user access level
- FAQ / Help Guideline
- Logout

D : Body area

- Text : Search by
- Button : Search
- Listbox : enable user to search by topic (e.g. wireless, web development), programme (e.g. IT,IS,CE,etc.), student name (e.g. Zaharah,Husaini), supervisor name (e.g. Low Tang Jung, Rozana Kasbon) and semester (semester taking FYP, e.g. JUN99,JAN00).
- Background : UTP logo

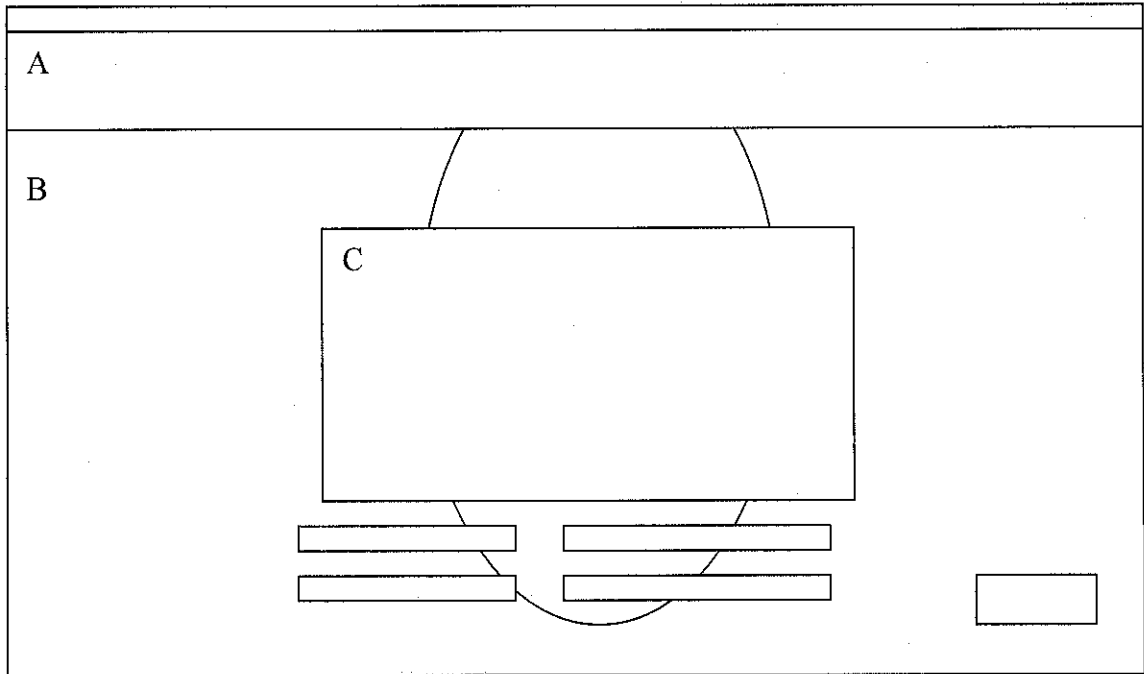
## Search Result page



### Description

- A : Banner (consist of pictures on UTP's surrounding)
- Have date and time counter
- B : User (Administrator) Login area
- Text : Username & Password
  - Text fields (each attribute 1)
  - Button : Go!
- C : Main Menu (links)
- User registration
  - Menu on this section changes according to user access level
  - FAQ / Help Guideline
  - Logout
- D : Body area
- Text : Search result of "<keyword>"
  - Table : result of search is viewed in table form. Attributes of table consist of topic, title of project (hyperlinked to document), student name, supervisor's name, programme and semester taken FYP
  - Background : UTP logo

## User (Administrator) Login Page



### Description

A : Banner (consist of pictures on UTP's surrounding)

- Have date and time counter

B : Body area

- Text 1 : Username
- Text 2 : Password
- Button : Enter
- Text fields (one for each attribute)
- Background : UTP logo

C : Image of Chancellor's Complex / Library

NOTE : This page is viewable to all user if click login page but only accessible to administrators assigned to the system.

## Upload document page

The diagram illustrates the layout of the 'Upload document page'. It is divided into four main sections:

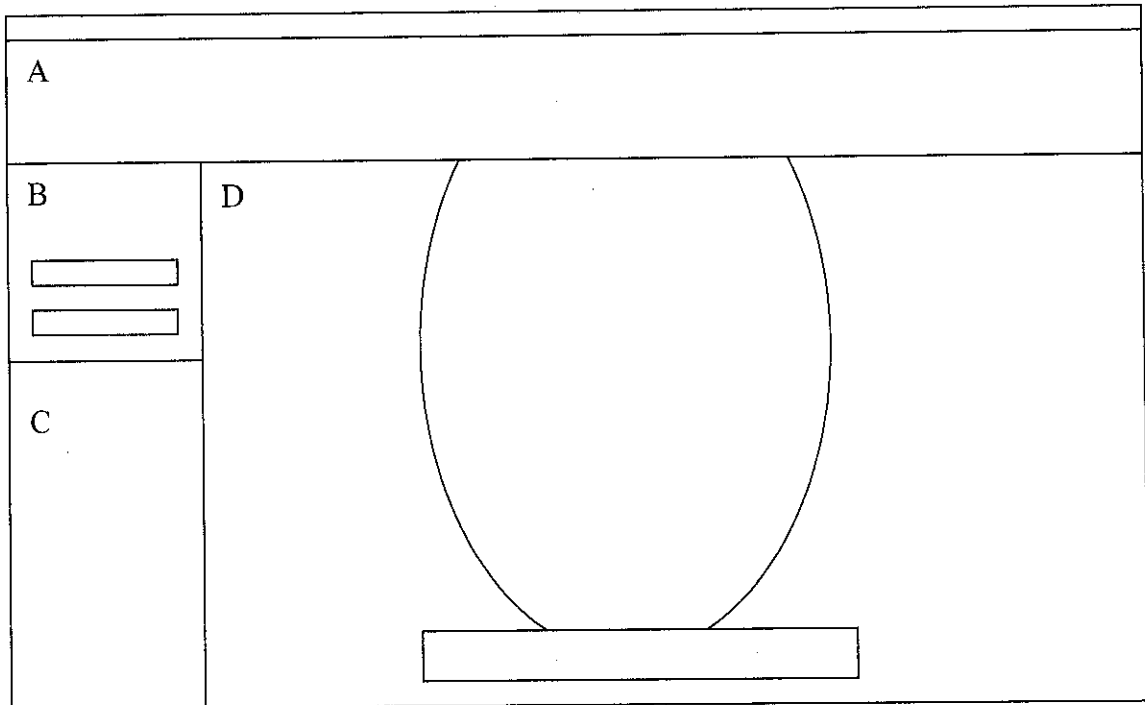
- A:** Banner area at the top.
- B:** User (Administrator) Login area on the left, containing two text input fields and a button.
- C:** Main Menu (links) on the left, containing a list of menu items.
- D:** Body area on the right, containing a large oval shape with several horizontal text input fields inside. Below the oval is a horizontal text input field labeled '1' and a button labeled '2'.

### Description

- A : Banner (consist of pictures on UTP's surrounding)
- Have date and time counter
- B : User (Administrator) Login area
- Text : Username & Password
  - Text fields (each attribute 1)
  - Button : Go!
- C : Main Menu (links)
- User registration
  - Menu on this section changes according to user access level
  - FAQ / Help Guideline
  - Logout
- D : Body area
- Texts : Topic, Title, Student Name, Supervisor Name, Programme, Semester
  - Text fields : for each attribute 1 and 1 allocated for filename browsed to be uploaded
  - Button 1: Browse
  - Button 2: Upload
  - Background : UTP logo

NOTE : This page is viewable only to administrators assigned to the system.

## Upload Success / Fail Page



### Description

- A : Banner (consist of pictures on UTP's surrounding)
  - Have date and time counter
- B : User (Administrator) Login area
  - Text : Username & Password
  - Text fields (each attribute 1)
  - Button : Go!
- C : Main Menu (links)
  - User registration
  - Menu on this section changes according to user access level
  - FAQ / Help Guideline
  - Logout
- D : Body area
  - Text : "The document has (been / not) successfully been uploaded."
  - Hyperlink : Back to Main Page
  - Background : UTP logo

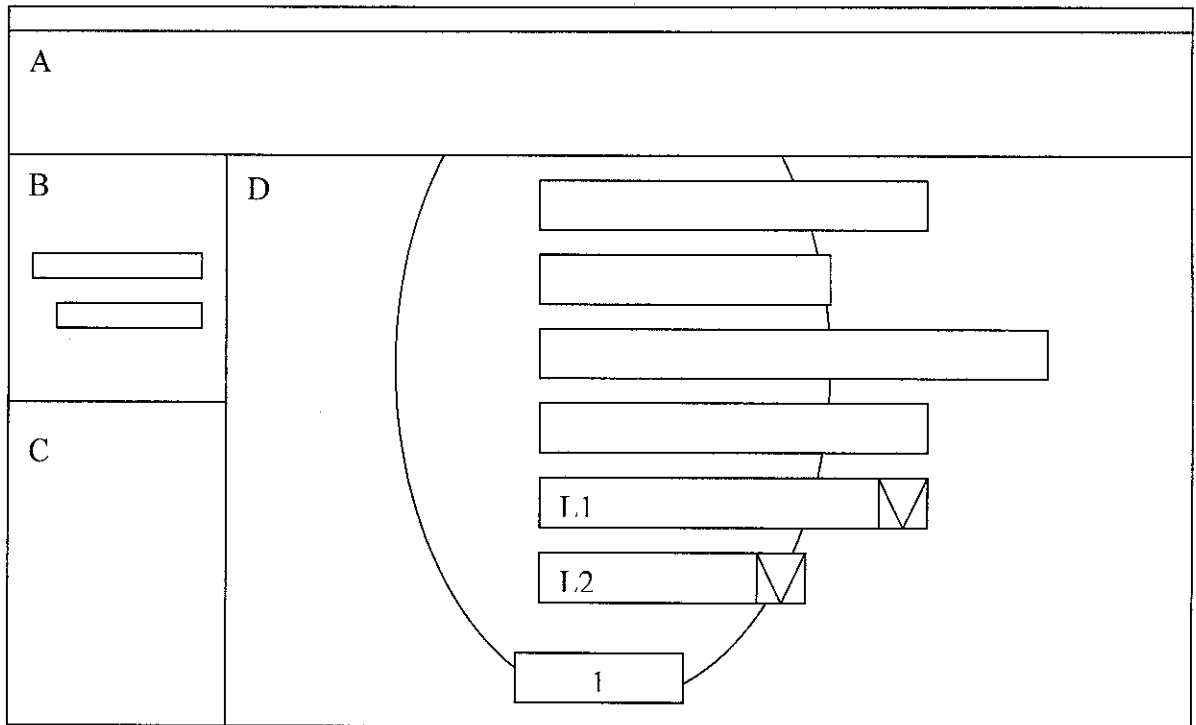
## Document selected page

A		
B <input type="text"/> <input type="text"/>	D	E
C		

### Description

- A : Banner (consist of pictures on UTP's surrounding)
- Have date and time counter
- B : User (Administrator) Login area
- Text : Username & Password
  - Text fields (each attribute 1)
  - Button : Go!
- C : Main Menu (links)
- User registration
  - Menu on this section changes according to user access level
  - FAQ / Help Guideline
  - Logout
- D : Body area
- Background : UTP logo
- E : Selected document (viewed in pdf format)

## User (Administrator) Registration Page



### Description

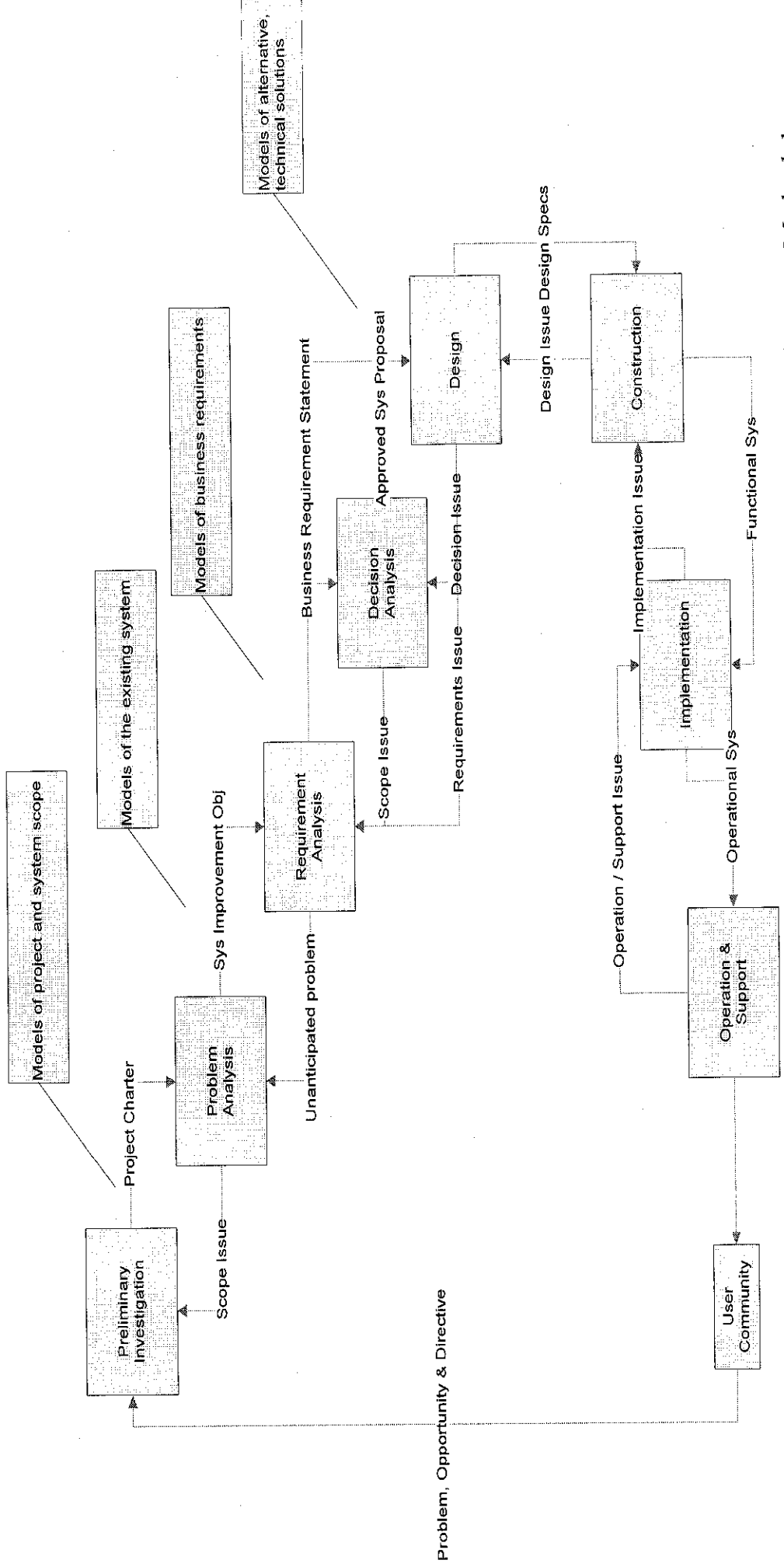
- A : Banner (consist of pictures on UTP's surrounding)
  - Have date and time counter
- B : User (Administrator) Login area
  - Text : Username & Password
  - Text fields (each attribute 1)
  - Button : Go!
- C : Main Menu (links)
  - User registration
  - Menu on this section changes according to user access level
  - FAQ / Help Guideline
  - Logout
- D : Body area
  - Texts : Username, Password, Name, Position, Programme, Admin User Level
  - Text fields : for each attribute 1 except for Programme attribute and Admin User Level attribute
  - Button 1: Register
  - Listbox 1: IT, IS, CE, ME, EE, CV
  - Listbox 2: Level 1 Web Support (Champion)
    - Level 2 FYP Coordinator
    - Level 3 Lecturer
  - Background : UTP logo

NOTE : This page is viewable only to **1<sup>st</sup> level** administrator(s) assigned to the system.



## **APPENDICES C**

### **FYP DIGITAL LIBRARY SYSTEM METHODOLOGY**



**Figure 4 Model Driven Development Methodology**



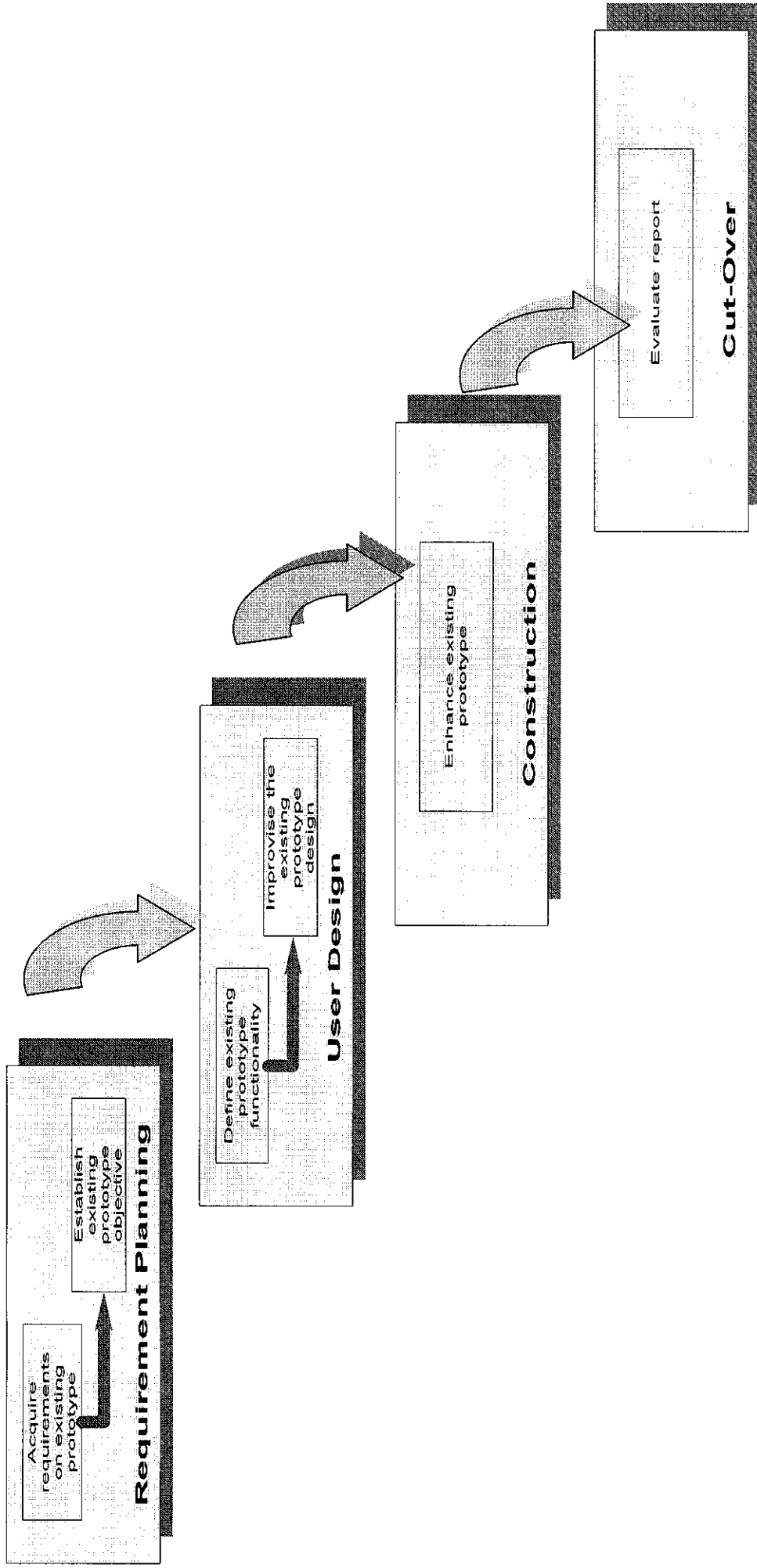


Figure 5 Rapid Application Development Methodology (General Version)

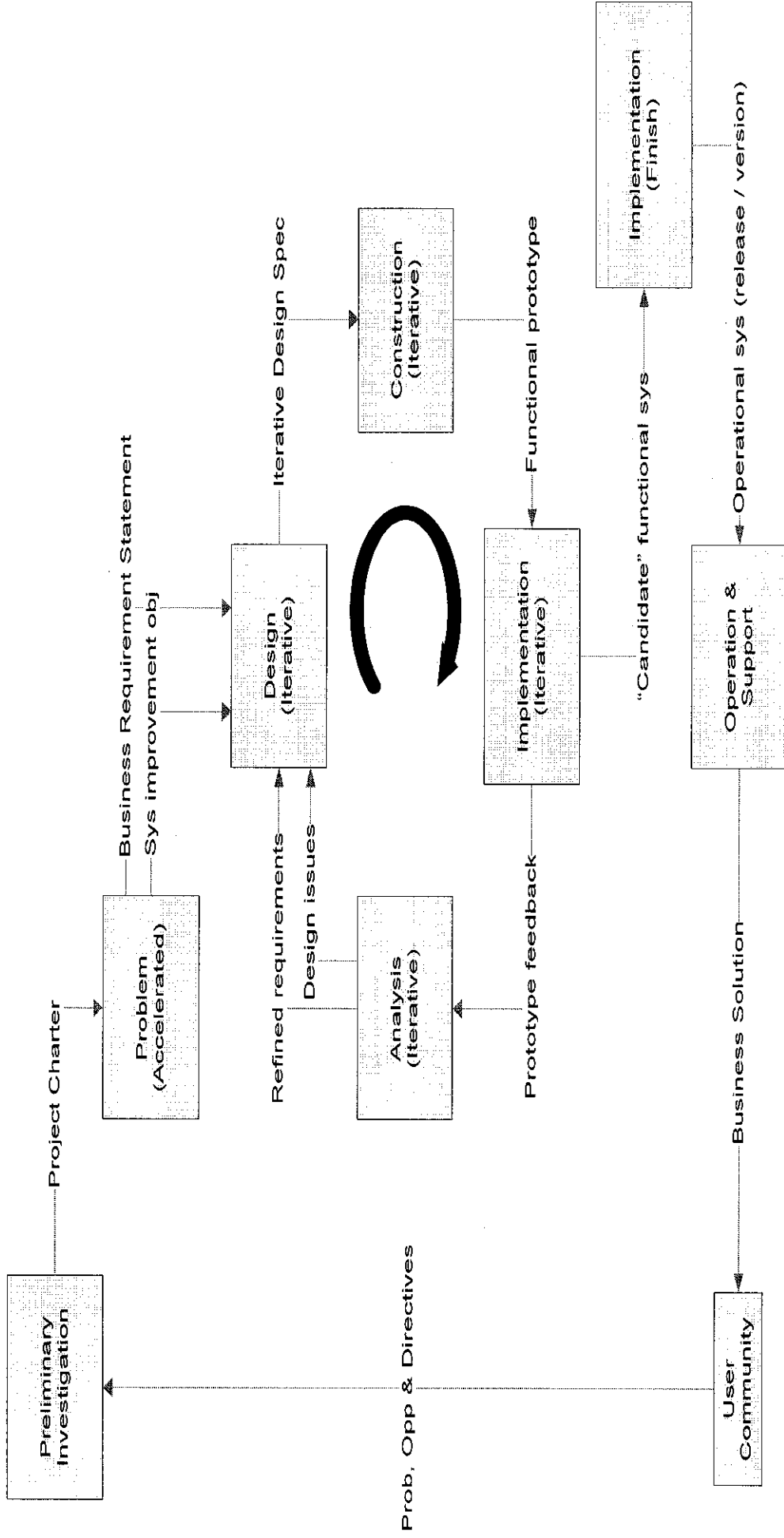


Figure 6 Rapid Application Development Methodology (Detailed Version)

# **APPENDICES D**

## **FYP DIGITAL LIBRARY UML DIAGRAMS & DATABASE STRUCTURE**

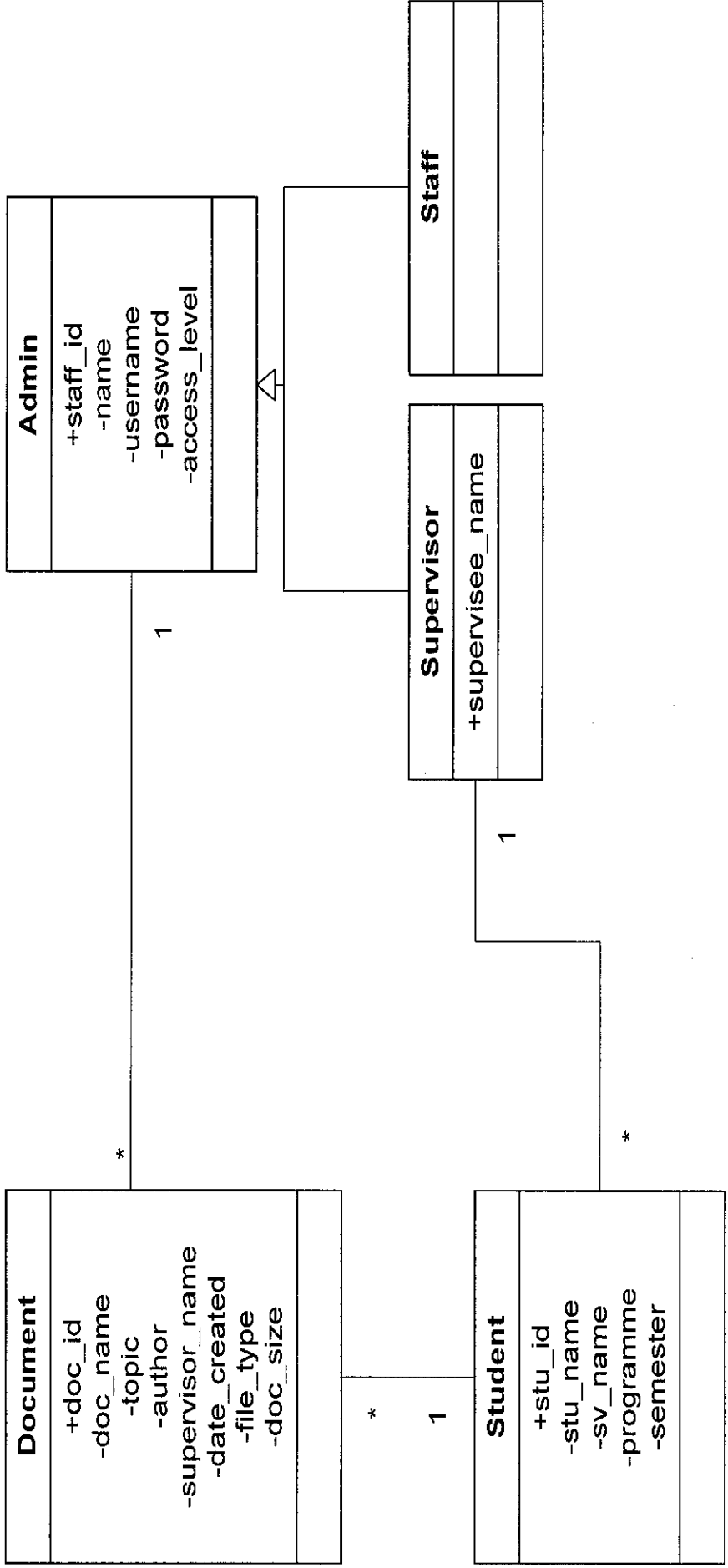


Figure 7 FYP Digital Library Class Diagram

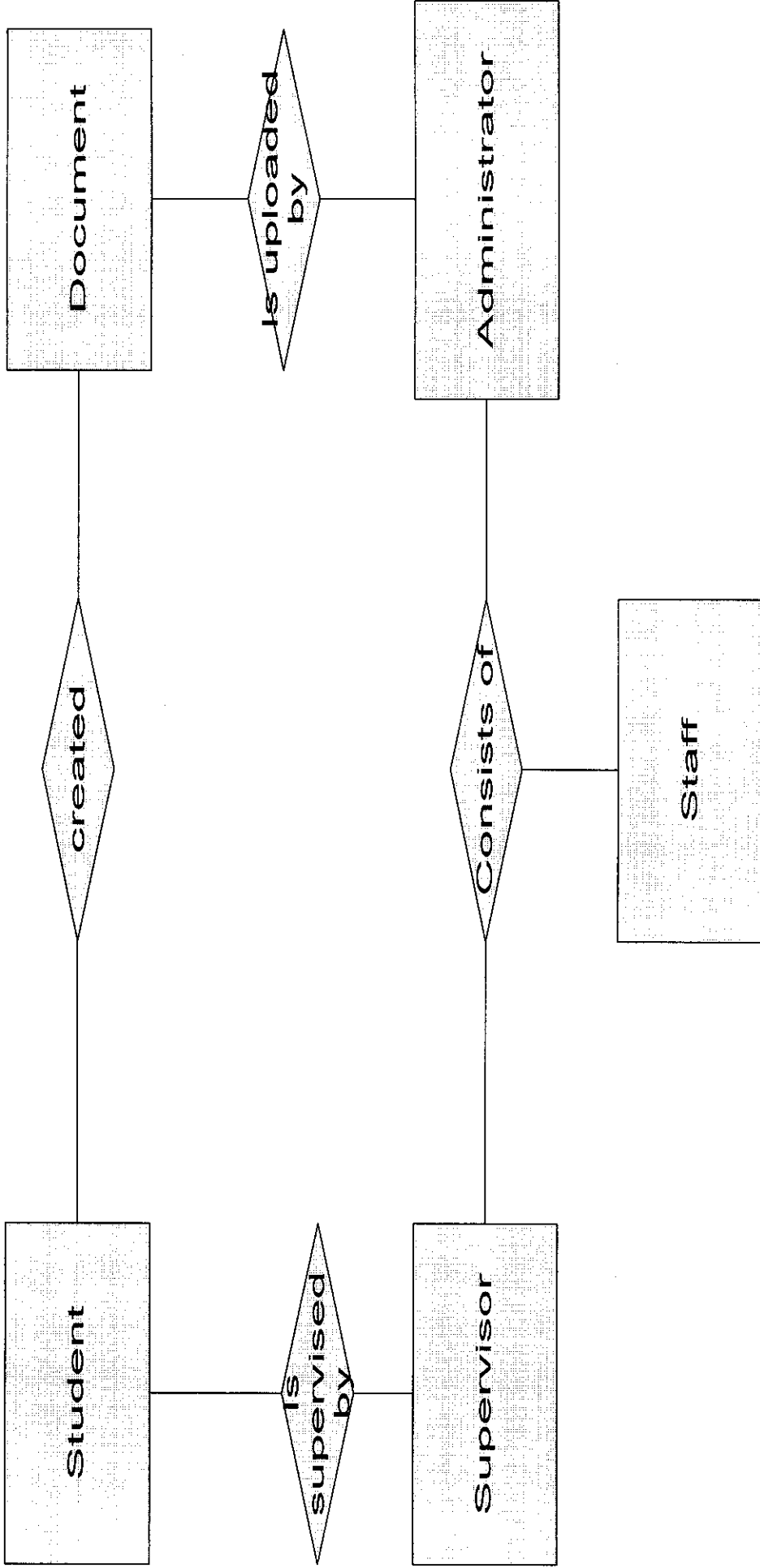


Figure 8 FYP Digital Library Entity-Relationship Diagram



**Table 1 FYP Digital Library Database Structure**

Table Name	Attribute	Data Type	Field Length	Description
<b>FYP_doc</b>	title	varchar2	100	Document title
	stu_name	varchar2	50	Author
	sv_name	varchar2	50	Supervisor's name
	sem	varchar2	8	Semester taking FYP
	doc	longblob		Document file

Table name	Attribute	Data type	Field length	Description
<b>FYP_register</b>	admin_name	varchar2	50	Admin's full name
	username	varchar2	15	Admin's login ID
	password	varchar2	15	Admin's access code
	c_pword	varchar2	15	Confirmation of admin's access code
	access_level	varchar2	30	Admin's level of access in system

## **APPENDICES E**

### **FYP DIGITAL LIBRARY SYSTEM SNAPSHOTS**

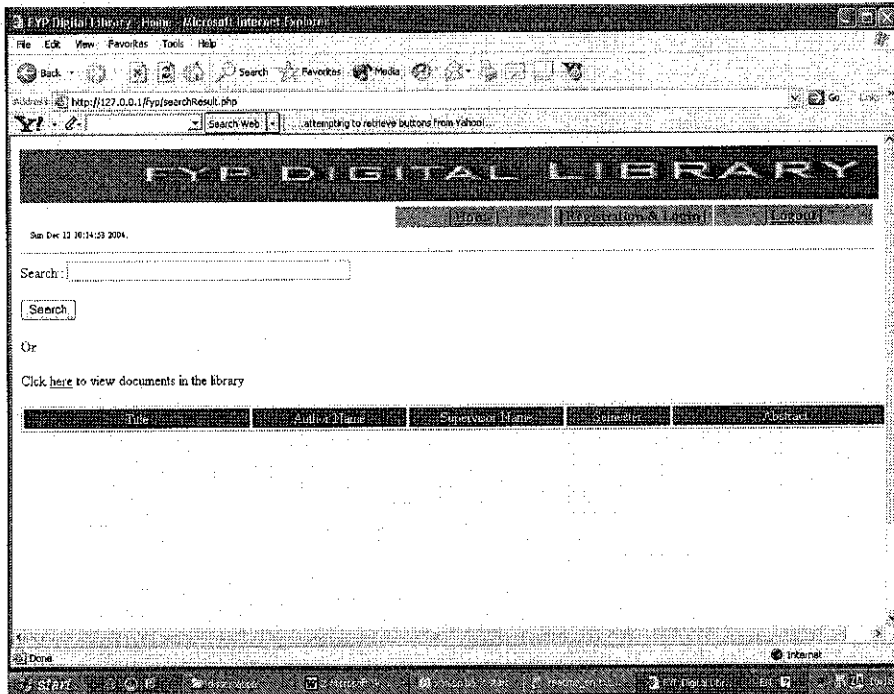


Figure 9 FYP Digital Library Default System Main Page (HOME)

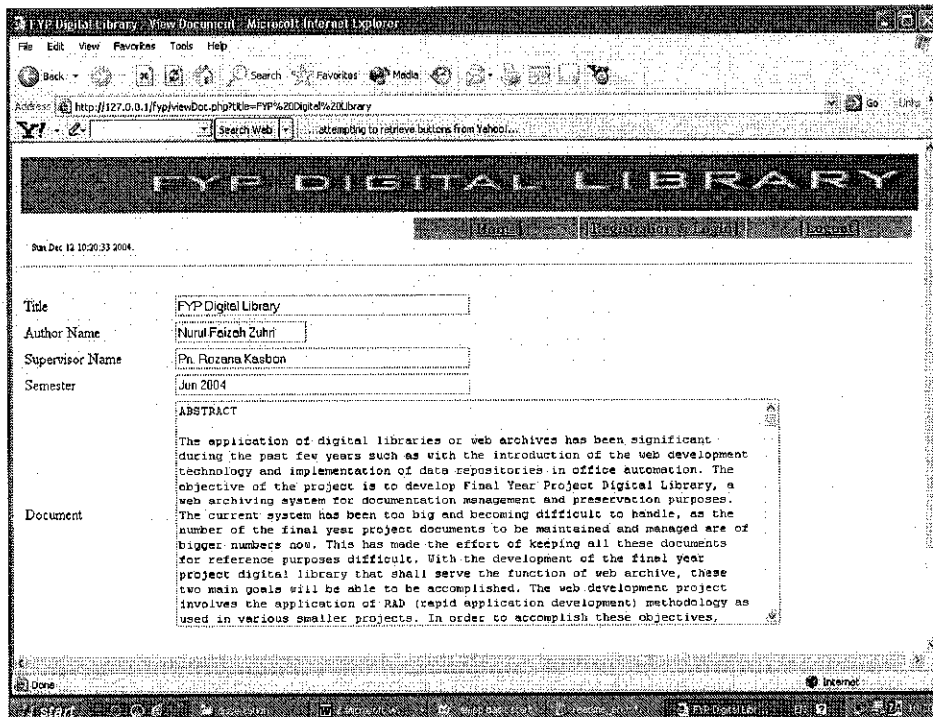


Figure 10 FYP Digital Library view Document page

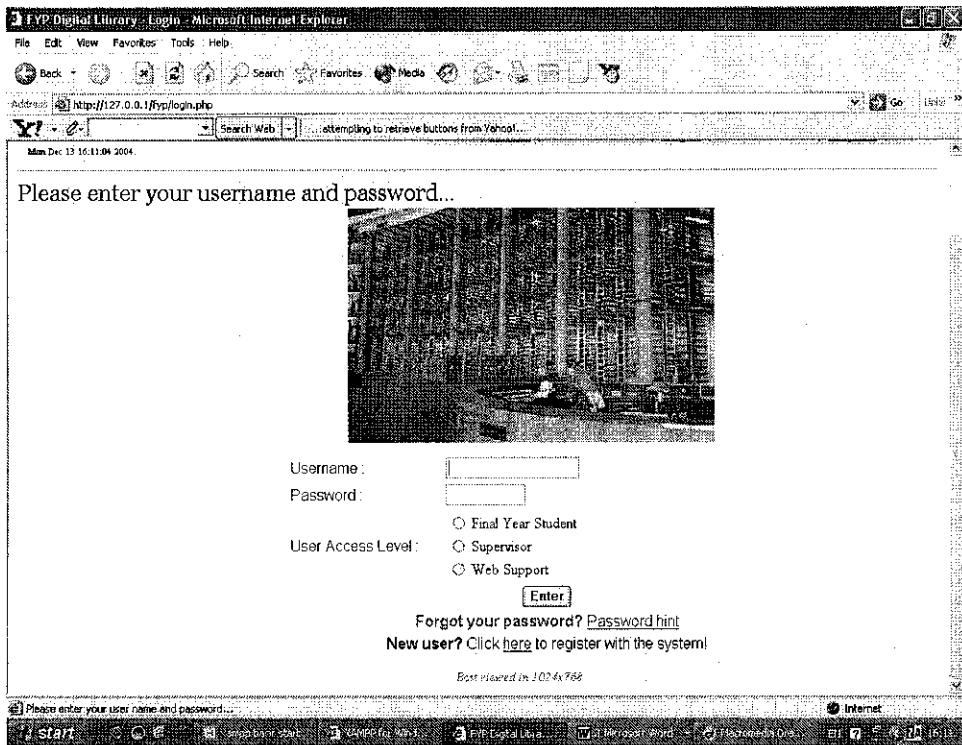


Figure 11 FYP Digital Library Login Page

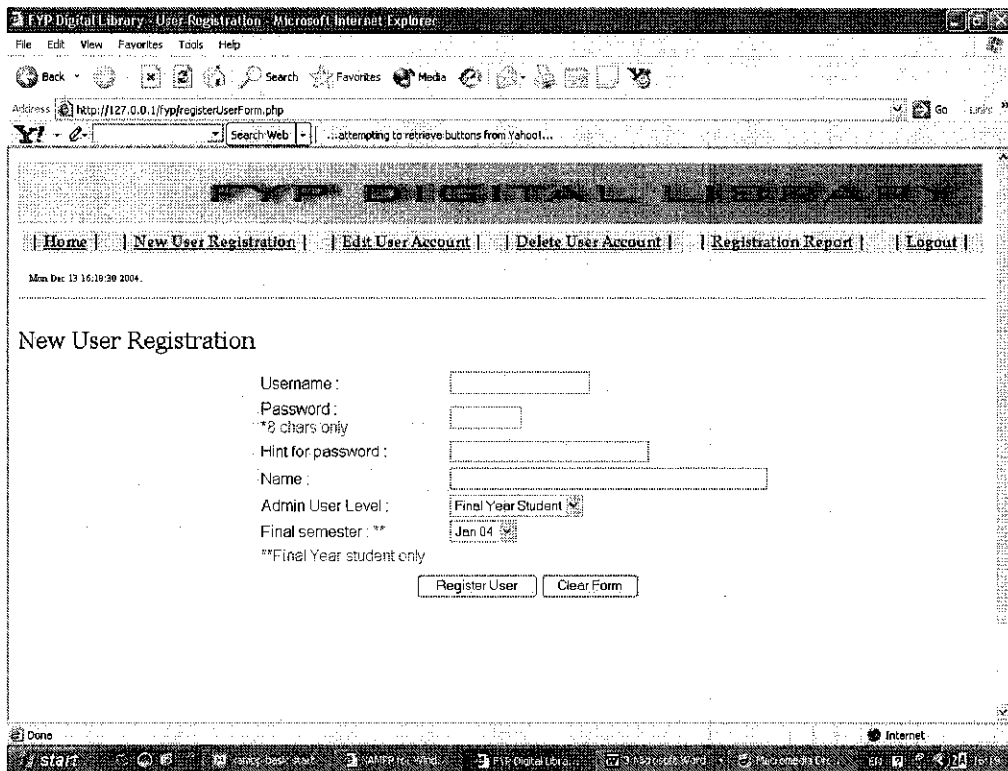


Figure 12 New user registration form

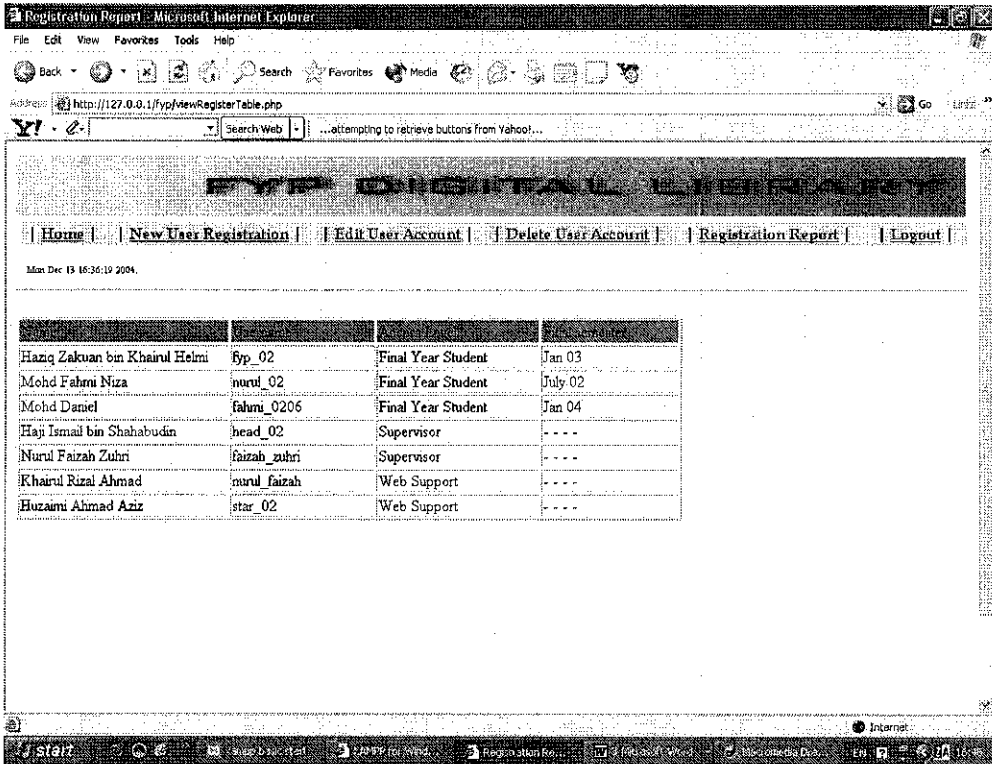


Figure 13 View User Registration Report page

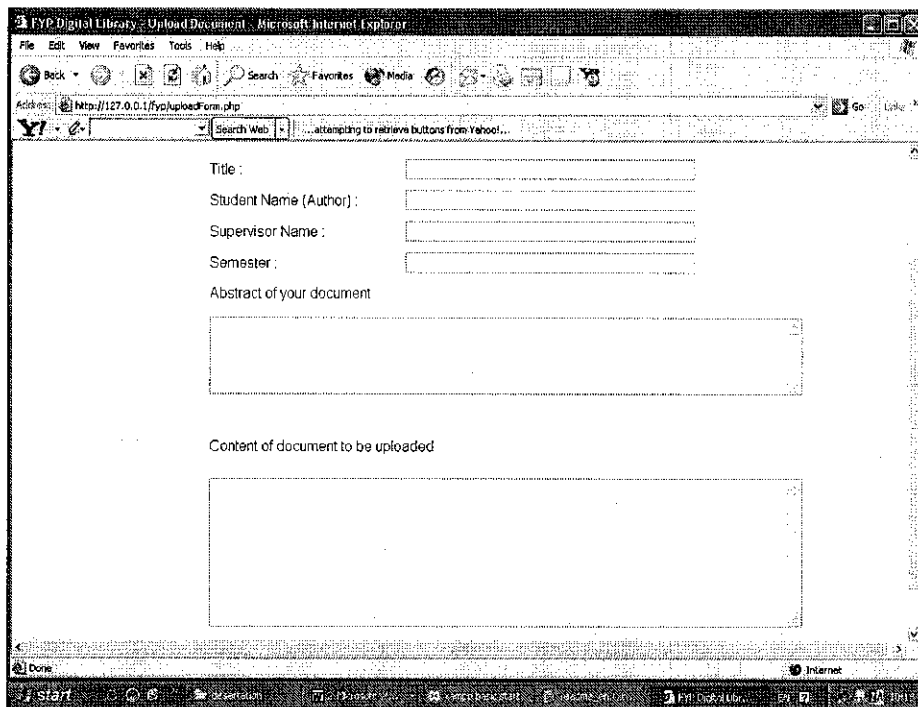


Figure 14 Upload document page

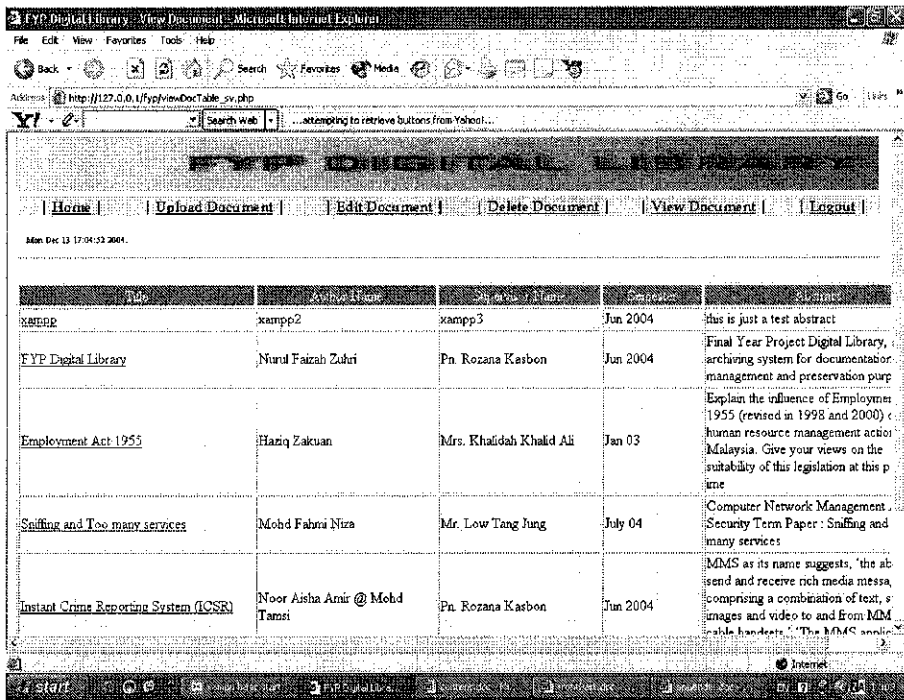


Figure 15 View Document list page

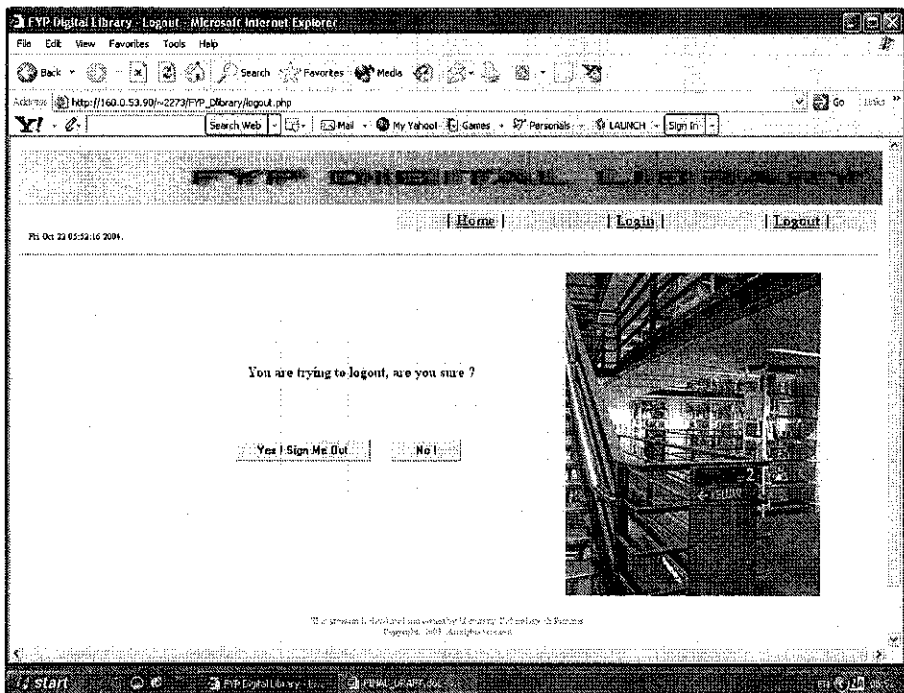


Figure 16 System logout page

**APPENDICES F**

**ACM DIGITAL LIBRARY**

**SNAPSHOTS**

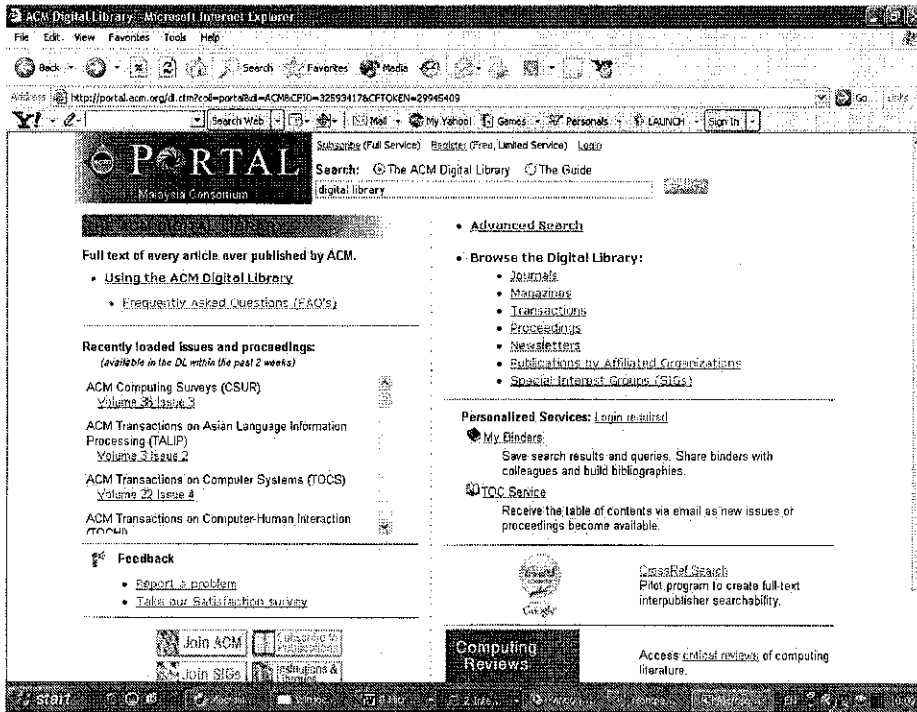


Figure 17 ACM Digital Library Main Page

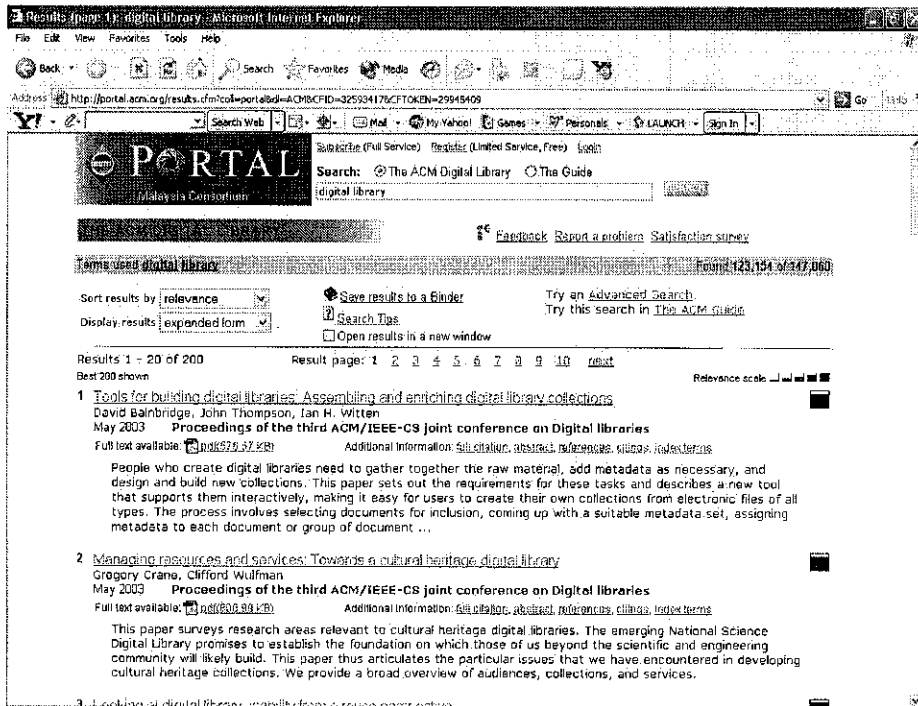


Figure 18 Search Result page



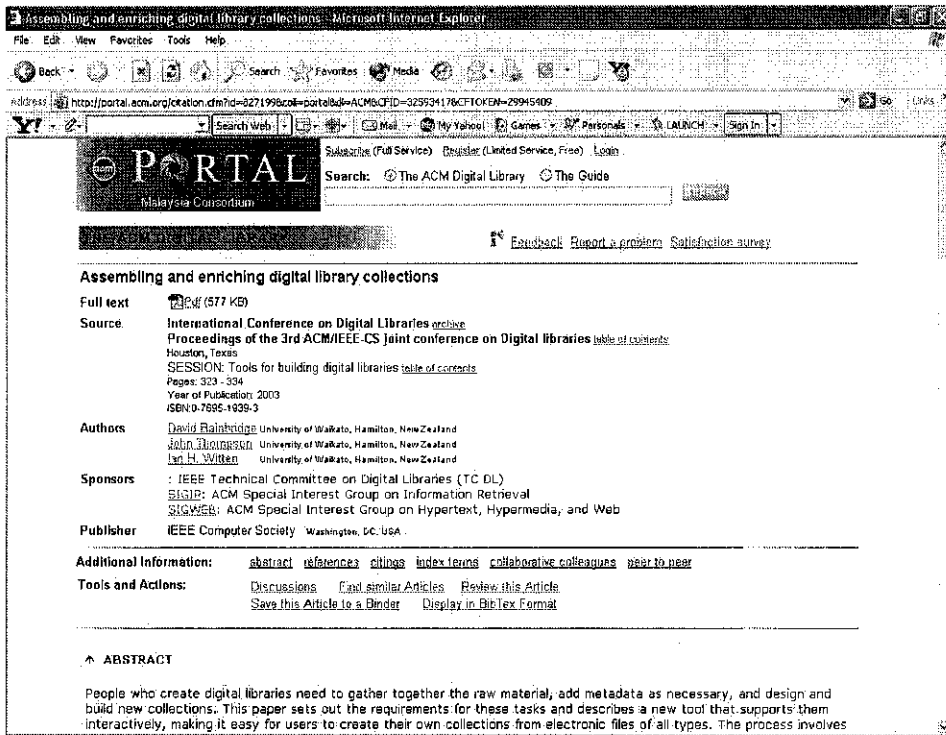


Figure 19 View Document page (details of document as well as abstract is included)

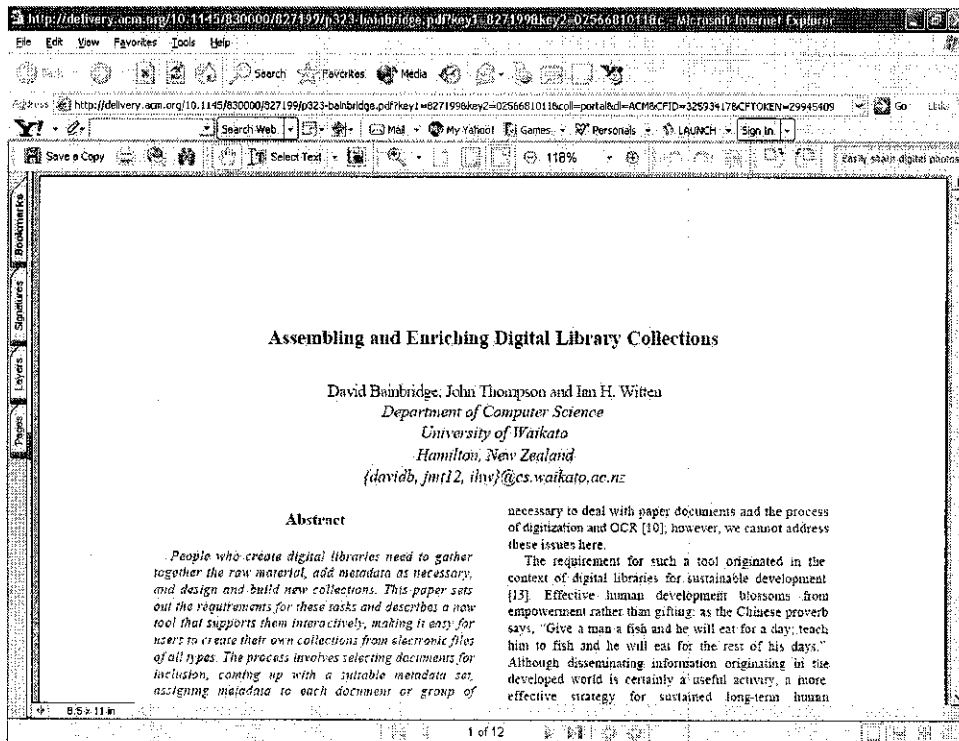


Figure 20 View Document (in PDF formats)